Volume 3
Issue 8

RISC USER

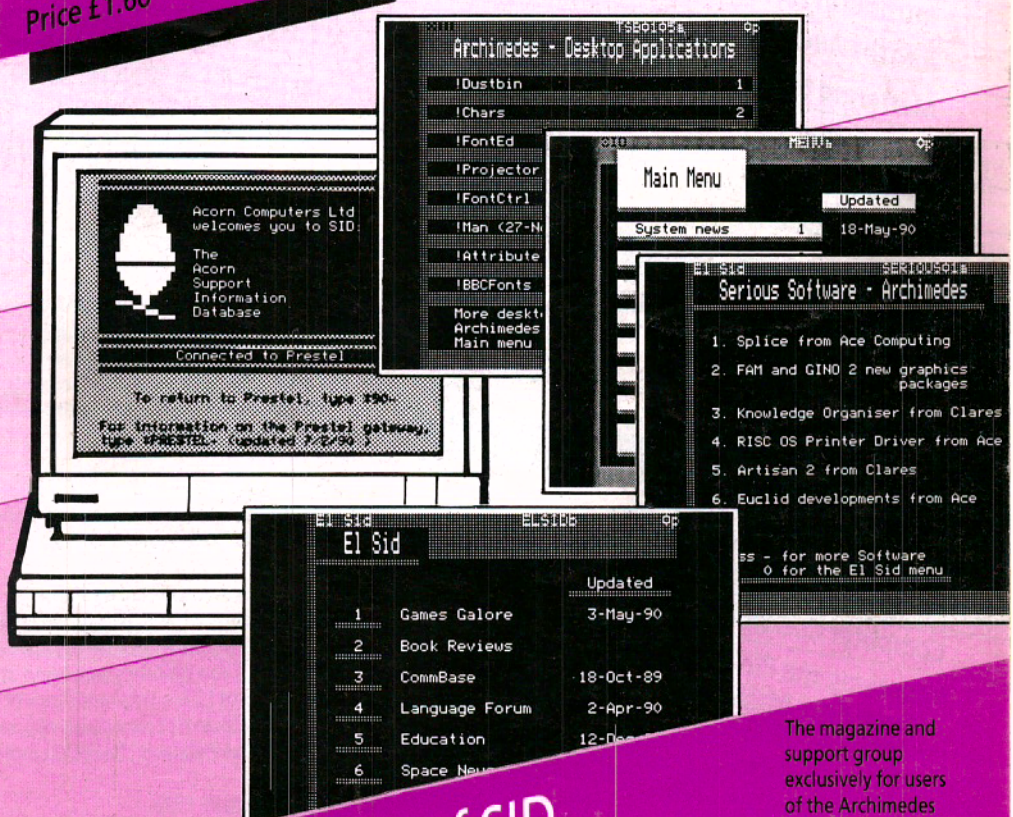
JULY/AUGUST 1990
Price £1.60

Wimp Applications Made Easy

A Handy Mouse Speed Controller

Stepped Renumber

DTP Resources



Making the Most of SID

The magazine and support group exclusively for users of the Archimedes

ISSUE 8
VOLUME 3
JULY/AUGUST 1990

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RISC USER

THE ARCHIMEDES MAGAZINE AND SUPPORT GROUP

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EDITORIAL

DTP ON THE ARCHIMEDES

All RISC USer subscribers should have received with the June issue of RISC User a copy of our promotional leaflet on Ovation, BEEBUG's new desktop publishing package. Desktop publishing (or simply DTP as it is known) has become an important application on most computer systems, and a real choice is now available to Archimedes users, with ***Acorn DTP****, Computer Concepts'* ***Impression****,* ***Ovation*** *from BEEBUG and* ***Tempest*** *from Clares Micro Supplies. Indeed, so powerful and versatile is the new generation of DTP software that it is increasingly questionable whether word processors as we know them are still an adequate and cost effective tool.*

As some readers may be aware we use DTP very extensively ourselves to originate both BEEBUG and RISC User magazines, the Retail Catalogue, and many other items. We have been doing this for well over three years using professional quality software on Apple Macintoshes (neither the Archimedes nor suitable DTP software were available when we started). We have come to appreciate the tremendous improvement that DTP brings to almost any printed page, and indeed, DTP can rapidly become quite addictive.

When it came to designing our own DTP software for the Arc we naturally set out to produce a package which was as easy and intuitive to use, and equal in quality to the Macintosh systems with which we are familiar. We also sought to improve on certain features which our experience had shown to be too limited.

The result is Ovation, a DTP package for the Arc with a truly professional feel to it and yet still easy to use (and to learn). The detailed specification is given in the leaflet referred to earlier, and we certainly believe we have achieved our aims.

I recently took part in an Acorn Roadshow, visiting a number of venues in England and Scotland, talking about and demonstrating Ovation to teachers and advisers concerned with a wide variety of age groups and abilities. The response to Ovation from all those I spoke to was very encouraging, particularly with regard to its ease of use. And the more I used Ovation during the course of the roadshow, the more enthusiastic I became about it as a user.

As I said earlier, given the availability of DTP packages like Ovation, it is difficult to understand why anyone would wish to continue using a conventional word processor. DTP offers virtually all the features of word processing, and so much more.

Well I hope I have said enough to convince you both of the value of DTP as a major tool for any Archimedes user, and to encourage you to give serious consideration to Ovation as a high quality, professional product.

To help you further, we have prepared a demo disc of Ovation which costs just £5 (including VAT and p&p) which will be sent to any potential purchaser on request. Furthermore, your £5 can be entirely recouped if you subsequently order the full Ovation package from us. What have you got to lose? Both the demo disc and the full Ovation package are available now.

M.C.W.

• News • News • News • News •

MIDNIGHT DRIVERS

Midnight Graphics, a name new to the Archimedes world - see this month's review on DTP Resources - has announced a number of colour printer drivers. These are multi-tasking sprite printers rather than conventional RISC OS printer drivers. As a result, printing can take place in the background, while you get on with other work.

Sprites can also be scaled before printing, and colour patterns can be selected which are claimed to give better intermediate colours than those provided by Acorn or Ace. Printers covered are the Star LC10 and XB24, the Citizen Swift 9 and 24 pin, the Integrex Colourjet 132, the HP Paintjet, and the Juki 5520. Sprites can also be printed in single, double or quad density. Each printer driver costs £29.95 inc. VAT. Midnight Graphics is at 5 Victoria Lane, Whitefield, Manchester M25 6AL, tel. 061-766 8523.

DATA LOGGING FOR THE ARCHIMEDES

One area where the Archimedes has yet to match the BBC micro is in the area of data logging. G.A.Herdman Educational is helping to change that by releasing an Archimedes version of its *Recording Digital Thermometer*, though an I/O podule is an essential prerequisite. The package includes twin ready-calibrated temperature probes, large-character digital display, graphical displays covering time intervals from 2 minutes to 18 hours, optional printer output, data storage for future analysis and more. The probe units fit the analogue port and are supplied with 3 metre leads as standard. The twin probe version costs £35.99 inclusive, and there is a single probe version for £29.99. Contact G.A.Herdman Educational, 43 St Johns Drive, Clarborough, Retford, Notts DN22 9NN, tel. (0777) 700918.

MINERVA ANNOUNCES DATABASE AND WORD PROCESSOR

Not content with System Delta Plus, and the more sophisticated Multistore, software house Minerva has announced yet another database system for the Archimedes, this time called *FlexiFile*. This is described as a multi-tasking database designed specifically for small businesses, education and home hobbyists looking for flexibility at a low price.

FlexiFile, which is controlled by a so-called video style interface for ease of use, is scheduled for release in early June, and will retail at £149.95 inc. VAT.

Minerva has also released a word processor called *EasiWord*, which with its potential for large letter displays is claimed to make it ideal for use with younger children or those who are partially sighted. Text, background, and highlights can be in any colour, enhancing its appeal for children. EasiWord will also be available early June for £39.95 inc. VAT. For more information on both products contact Minerva Software, Minerva House, Baring Crescent, Exeter EX1 1TL, or tel. (0392) 437756 (note the new address).

NEW SPREADSHEET FROM ACORN

Details of Acorn's long awaited spreadsheet, called *Schema*, have begun to emerge. Designed specifically for the Archimedes (including the A3000) and RISC OS, the new spreadsheet package is fully multi-tasking, and supports advanced statistical and financial features using a WYSIWYG display.

Maximum spreadsheet size has been set at 32,000 columns by 32,000 rows. Multiple worksheets can be linked together, and there are built-in facilities for the production of graphs and charts. Macro programming support enables customised spreadsheet applications to be developed with ease, with a macro capture facility allowing regularly repeated operations to be recorded for subsequent playback.

Extensive printer support is also provided, allowing either draft or final copy to be produced as required totally under user control. More sophisticated report generation is possible using the standard RISC OS printer drivers.

The price has not yet been fixed nor the release date which is some months away, but

Acorn has already been demonstrating pre-release versions to interested parties. For more information contact Acorn Computers Ltd, Fulbourn Road, Cherry Hinton, Cambridge CB1 4JN, tel. (0223) 245200.

MORE CONTROL SOFTWARE FROM BEDFORD

An impressive enterprise from Bedford Modern School has resulted in the release of two substantial pieces of control software for the Archimedes. *Sparkle* is an application designed for use with I/O control devices such as the Deltronics control box. A complete programming language allows the user to make full use of the power of the control box with the minimum of ease. *Sparkle* is fully RISC OS compatible and costs £57.44 inc. VAT.

The second product is an application called *Robot* for complete control of the Alfred robot. Again, *Robot* is fully programmable with a host of features. The price is £45.94 inc. VAT.

A company called Aietos has been set up by Bedford Modern School to market this and, it is hoped, further software. As an indicator of what they have achieved, Aietos took part in Acorn's recent roadshow. For more information contact Aietos at Bedford Modern School, Manton Lane, Bedford MK41 7NT, tel. (0234) 64331.

INBETWEENING FROM ACE

Latest release from that home of graphics software, Ace Computing, is a new product called *Tween*. This enables cartoon sequences to be created by taking two Draw files and with the help of a spreadsheet generates all the intermediate images which can be used to produce a simple animated sequence.

Tween works with any Draw files, including output from Graphbox, Presenter, Euclid and other CAD software. Interesting effects can also be produced with text using *Tween* to animate output from FontFX (see DTP Resources review in this issue of RISC USer). The output from *Tween* is in Ace *Film* format, allowing it to be used also within Genesis.

Ace Computing expects to release shortly the third disc from *Elements* the independent Euclid User Group, while a new ray-tracing package, *ArcLight* is also due for release soon.

Tween is available now at a special introductory price of £30.00 inc. VAT from Ace Computing, 27 Victoria Road, Cambridge CB4 3BW, tel. (0223) 322559.

ACORN ACROSS THE SEAS

In an interesting move, Acorn Computers has made an agreed bid for the Australian based Barsons group, the major distributor of Acorn's products to Australia and New Zealand. Acorn believes that this move will enable it to expand further an already established market (Acorn is a major force in education in both countries) with better support than ever.

ECONET TELETEXT SERVER

Specialist Econet supplier, XOB of Forfar in Scotland, has announced an Econet Teletext server for RISC OS. This runs as a multi-tasking application with the RISC OS Desktop on any Archimedes or A3000. Once installed, any Acorn computer (including BBC micro and Master) can request the server to download Teletext pages, which the server does via a Morley Teletext adaptor. An intelligent queueing system means that multiple requests are handled with the minimum of delay. The software (only) costs £100.05 inc.VAT, or with the Morley Teletext adaptor for £235.75 inc. VAT. For more details contact XOB, Balkeerie, Eassie (by Forfar), Angus, Scotland DD8 1SR, tel. (030 784) 364.

SCANNER FOOTNOTE

Computer Concepts would like to point out that its Scanlight Junior (reviewed in RISC User Volume 3 Issue 7) has been based on the Mitsubishi unit, rather than the Geniscan, which was used for a very few early orders. The Mitsubishi unit also has a resolution setting (up to 400 dpi). RU

SILICON VISION News

ARCHIMEDES SOFTWARE DEVELOPMENTS, ISSUE 2

RISC OS SolidTOOLS achieve total integration

SolidTOOLS is the first fully integrated environment for 3D CAD, Photo-realistic rendering, Interactive animation, Programmable animation and high resolution hardcopy to printers and plotters for the Archimedes taking the computer to new heights of design productivity and performance exceeding the capabilities of 'heavy-weight' packages on PC-compatibles and workstations which cost considerably more.

The software provides 3D CAD facilities for Architectural, Engineering and Interior design and adopts the industry standard 1st & 3rd angle projection technique for drawing simultaneously in plan, front and side elevations together with a 3D projection to view the design from any angle. A unique smooth shading facility is also provided for instant high quality rendering of the design for improved presentation.

An interactive 3D animation facility also allows flight-paths for cameras and objects to be drawn to create 'fly-through' effects for animated sequences to further improve presentations or to analyse the ergonomics and aesthetic qualities of the design.

The system also boasts breath-taking photo-realistic capability using advanced ray-tracing techniques with object orientated design facilities pushing the Archimedes colour display hardware to its limits for reflections, transparencies, shadows, and textures.

Extensive hardcopy facilities are also provided to output designs to printers and all industry standard plotters at maximum resolution for high quality CAD drawings.

The powerful RISC OS multi-tasking capability also allows greater integration with other related applications such as DTP and ART software so that 3D shaded images may be included in other documents for improved presentation.

An 'open architecture' approach also allows the importing of externally generated designs and programming facilities allow access to the high performance 3D display functions of the package for further customisation if required.

Business Software

The new range of professional business software is now available and includes DataVision for true relational database management which is unique in providing both relational data-entry and reporting facilities together with integrated wordprocessing, mail-merging and label printing facilities. The Financial Accountant package for business accounting also includes DataVision and provides a fully integrated accounting system.

ShareHolder for share portfolio management & OfficeTOOLS for office automation and computer controlled presentations further extend the range to provide powerful serious business software for the demanding user.

All software run in native mode on A300-400 Series & A3000 with RISC OS and are available now.

SILICON VISION LTD, SIGNAL HOUSE, LYON ROAD, HARROW MIDDLESEX HA1 2AG. TEL: 081-422 2274 or 081-861 2173 FAX: 081-427 5169. TELEX: 918266 SIGNAL G.

PCB Design Tools

The recently launched ARC-PCB Professional package is the result of continuing research & development to produce a powerful PCB design system which out-performs 'heavy-weight' PC-based PCB layout design systems costing considerably more.

Features include Automatic routing, Rats-nesting, Multiple-layers, Circular, Oval & Surface mount Pads, 0.001" resolution, 32"x32" maximum board size, On-line Help, Fast Zoom/Pan/Redraw, Text & Silkscreen facility, Variable Track/Pad/Text/Grid sizes, Hierarchical Part Libraries, Block Move/Copy/Rotate/Mirror/Erase options, Component Pulling, Clear pad holes, Drilling data, up to 300,000 components and instant editing operations for substantially increased productivity. The industry standard HP-GL, GRAPHTEC, PLOTMATE plotters and printers at their highest resolutions are supported for high quality PCB artwork. An optional GerberPLOT driver supporting Photoplotters for the highest quality PCB artwork is also available.

SILICON Designs

Electronic design engineers and educational institutions are discovering that the Gate Array design system from Silicon Vision provides a cost effective introduction to the world of chip design where expensive silicon fabrication facilities are not needed but only the design facilities for teaching purposes are required at a low cost. This avoids the expensive trial and error iterations with industrial systems during the early stages of learning chip design skills.

Further Information

A free product catalogue detailing all our software packages for the Archimedes is available on request.

A Handy Mouse Speed Controller

Adam Goodfellow describes a handy utility which sits on the icon bar for instant adjustment of mouse pointer speed.

When using Desktop applications, situations can arise where the current mouse/pointer speed is inappropriate to the task in hand. There are two ways round this problem: you can configure the mouse speed to 1 or 2, and suffer a slow mouse when you would rather it was fast, or enter Basic and use Basic's MOUSESTEP command to change the mouse speed when required. This article presents an alternative method in the form of a small Wimp application called Mouse that resides on the icon bar.

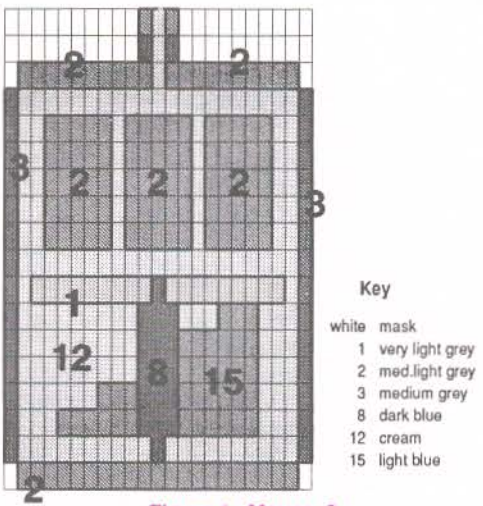

Figure 1. Mouse_3

The utility allows you to switch instantly between two mouse speeds, one fast setting for normal mouse operation and a slow setting for when more precise positioning is required. Both speeds can be adjusted to any of the five settings which are possible, and thus the settings can be customised to suit your own preferences. This is all achieved by clicking on the icon bar icon, which changes to indicate the current setting.

CREATING THE APPLICATION

If you have a copy of this month's magazine disc then you can ignore this section. To enter the files required for this application, you will need to be familiar with both the Edit and Paint applications (on Applications disc 1). First of all, you will need to create a directory called !Mouse, in which all files will be saved. Then use Edit to create an Obey file and enter listing 1. This file should be saved into the !Mouse directory under the filename !Run. Note that the odd character which appears in this listing is above the '£' on the keyboard (i.e. it is Shift-£)

Next, enter Basic and type in listing 2. Save this as a Basic program with the name !RunImage in the !Mouse directory. In addition to these files, you need to create a sprite file to contain the sprites used on the icon bar. There are five sprites in all called mouse_1 to mouse_5, all of which are of the same basic design.

First of all, you will need to run Paint and create a mode 12 sprite called mouse_3 23 pixels wide by 18 pixels high, and with a mask. The next stage is to call up the sprite you have created for editing by double clicking. If you look at the large sprite (figure 1) you will see that it is marked out with a grid, in which areas of the same shade are outlined with heavy black lines. Attached to each of these shaded areas is a number indicating the colour to be used (using the default palette). For example, if an area is marked 15, then the colour for that area is light blue.

Once you have filled in all the shaded pixels, select the colour fill option and global fill, and the mask colour from the palette. Then click on an unshaded (white) part of the sprite to create a mask for the sprite. Now that you have created the first

sprite, you can use it as a master for the remaining four sprites which can be copied from mouse_3 to mouse_1, mouse_2, mouse_4 and mouse_5. All that remains is to edit each sprite to give the correct position of the dark blue bar to indicate the 5 mouse speed settings 1 to 5 (as shown in figures 1 to 5).

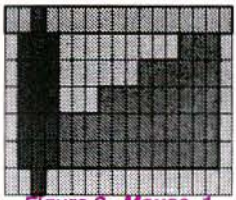

Figure 2. Mouse_1

Once all of the sprites have been created you should save the sprites in a file as Sprites in the !Mouse directory.

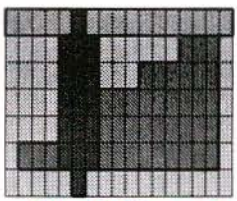

Figure 3. Mouse_2

You should now have an application directory called !Mouse which contains the files !Run, !RunImage, and Sprites. If you now double-click on this application you should find that a new icon appears on your icon bar.

USING THE APPLICATION

Mouse uses all three mouse buttons to perform various functions when the pointer is over the Mouse icon on the icon bar. The Select button is used to toggle between the two current speed settings. The Adjust button is used to alter the current speed setting (use the Select button to identify which of the two settings you want to change), while the Menu button provides Save and Quit options.

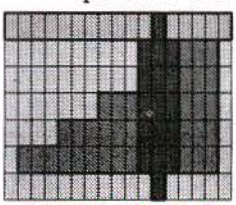

Figure 4. Mouse_4

The Save option allows you to save the current speed to CMOS RAM so that it becomes the default speed. You will notice that as you press the Select or Adjust buttons, the icon on the icon bar is updated to indicate the new speed by the position of the dark blue vertical bar. When the bar is left of centre the speed setting is slow (1 or 2) while to the right the speed is fast (4 or 5).

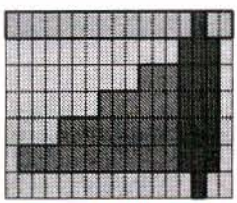

Figure 5. Mouse_5

Listing 1

```
Set Mouse$Dir <Obey$Dir>
If "<Mouse$Flag>" = "" then error !Mouse
    is already running
Set Mouse$Flag
WimpSlot -min 16k -max 16k
Run <Mouse$Dir>.!RunImage
```

Listing 2

```
   10 REM             >!RunImage
   20 REM Program     Mouse Speed Control
   30 REM Version     A1.0
   40 REM Author      Adam Goodfellow
   50 REM RISC User   July/August 1990
   60 REM Program     subject to copyright
   70 :
   80 ON ERROR OSCLI"Unset Mouse$Flag":E
RROR EXT ERR,REPORT$+" at line "+STR$ERL
:END
   90 DIM wimp 255, menu 255, icons 511,
 sprites 2559, mouse 11
  100 oldsp=2:iconbar=-2
  110 SYS "OS_Byte",161,194 TO ,,speed
  120 IF speed<1 speed=1 ELSE IF speed>5
 speed=5
  130 SYS "Wimp_Initialise",200,&4B53415
4,"Mouse" TO task
  140 !sprites=2560
  150 SYS "OS_SpriteOp",&10A,sprites,"<M
ouse$Dir>.Sprites"
  160 :SYS "Wimp_SpriteOp",40,-1,"!mouse
" TO ,,,w,h
  170 wimp!0=-1:wimp!4=0:wimp!8=0
  180 wimp!12=w*2:wimp!16=h*4
  190 $mouse="mouse_1":wimp!20=&0700311A
  200 wimp!24=mouse:wimp!28=sprites
  210 wimp!32=LEN("mouse_1")
  220 SYS "Wimp_CreateIcon",,wimp TO mic
on:PROCmouse
  230 $menu="Mouse":menu?12=7:menu?13=2
  240 menu?14=7:menu?15=0:menu!16=96
  250 menu!20=44:menu!24=0:menu!28=0
  260 menu!32=-1:menu!36=&07000011
  270 $(menu+40)="Save":menu!52=128
  280 menu!56=-1:menu!60=&07000011
```

```
290 $(menu+64)="Quit"
300 end=FALSE
310 REPEAT
320 SYS "Wimp_Poll",1,wimp TO reason
330 CASE reason OF
340 WHEN 2:SYS"Wimp_OpenWindow",,wimp
350 WHEN 3:SYS"Wimp_CloseWindow",,wimp
360 WHEN 6:PROCmousechange
370 WHEN 9:PROCmenudone
380 WHEN 17,18:IF wimp!16=0 end=TRUE
390 ENDCASE
400 UNTIL end
410 *UnSet Mouse$Flag
420 SYS"Wimp_CloseDown",task,&4B534154
430 END
440 :
450 DEF PROCmousechange
460 IF wimp!12=iconbar
470 CASE wimp!8 OF
480 WHEN 1:speed=(speed MOD 5)+1:PROCm
ouse
490 WHEN 2:SYS "Wimp_CreateMenu",,menu
,wimp!0-64,44*3+52
500 WHEN 4:s=speed:speed=oldsp:oldsp=s
:PROCmouse
510 ENDCASE
520 ENDIF
530 ENDPROC
540 :
550 DEF PROCmenudone
560 SYS "Wimp_GetPointerInfo",,wimp+4
570 CASE wimp!0 OF
580 WHEN 0:SYS "OS_Byte",162,194,speed
590 WHEN 1:end=TRUE
600 ENDCASE
610 IF wimp!12=1 SYS "Wimp_CreateMenu"
,,menu,wimp!0-64,44*4+52
620 ENDPROC
630 :
640 DEF PROCmouse
650 MOUSESTEP speed
660 $mouse="mouse_"+STR$speed
670 !wimp=iconbar:wimp!4=micon
680 wimp!8=0:wimp!12=0
690 SYS "Wimp_SetIconState",,wimp
700 ENDPROC
```

RU

Archimedes memory upgrades

A310 expanded to 2Mb - £375 **A310 expanded to 4Mb - £595**

These fully guaranteed boards (CJE Micro's) combine with the existing RAM in the machine to give a total of either 2 or 4Mb. The extra memory is functionally identical to that in a 400 series machine, and offers facilities which are simply not available with only 1Mb. A305 computers can also be fitted with these memory boards, although they must be upgraded to the full 1Mb first. Prices include VAT, fitting (3 day turn around) and carriage.

AVAILABLE NOW

★ **For the A305 and A310**

★ **Compact, single-board design - no messy ribbon cable**

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4-slot multi-layer backplane + fan (305/310)	£69.95
Impression	**£145**

Prices inclusive of VAT
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RAM for A3000... Only £99 inc. VAT
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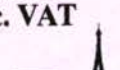


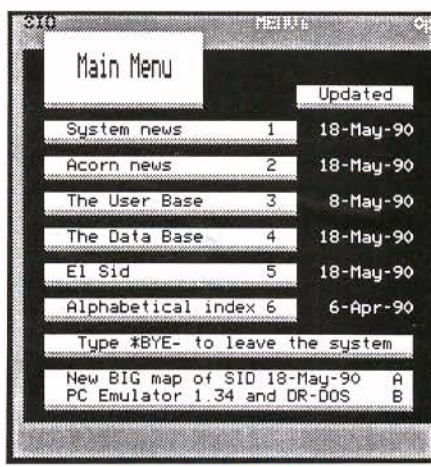
IFEL
36 Upland Drive
Derriford
Plymouth
PL6 6BD

Making the Most of SID

Acorn's Support Information Database contains much of interest to Archimedes users. Alan Wrigley has the details.

SID is an on-line database available free of charge to the general public on its own dedicated telephone line, or through a gateway from Prestel for a small charge. Anyone who has a modem and appropriate comms software can access SID.

As you might expect, all material on SID is exclusively for users of Acorn micros. All machines are covered, even the model B if there are items relevant to that computer. However, it is only natural that most material on SID is geared towards the Archimedes, and therefore RISC User readers will find much of interest and value to them.


Main Menu
Updated
System news 1 18-May-90
Acorn news 2 18-May-90
The User Base 3 8-May-90
The Data Base 4 18-May-90
El Sid 5 18-May-90
Alphabetical index 6 6-Apr-90
Type *BYE- to leave the system
New BIG map of SID 18-May-90 A
PC Emulator 1.34 and DR-DOS B

The Main Menu on SID

The first time you log on to SID, you may find yourself confused by all the different areas available to browse through. To help you, a map of SID is provided which can be downloaded as a Draw file, and subsequently printed out as a permanent reference for use when accessing the database. SID is a viewdata system, based around hierarchical menu screens, but like Prestel it makes use of keywords, which are a lot faster to use once you know where you want to go, and this is where the map will help.

SID PROFILE

SID is organised into five main areas, namely News, The User Base, The Data Base, El Sid and Bulletin Boards. The news area is self-explanatory and contains news, not only about Acorn and its products, but information from third party suppliers as well as news affecting educational and healthcare users. The User Base contains various items such as dealer lists and adverts, directories, information about SID and its users, and closed user groups, for example for dealers and schools. El Sid is a collection of magazine areas, offering comment and opinion, features on micro-related topics such as education, comms and graphics, and software reviews.

USEFUL INFORMATION

The real meat of SID is in the remaining two areas. Within The Data Base you can find downloadable files of information, for example application notes, details on a number of products, and of course a very wide range of downloadable software. Software found on other, private, bulletin boards is often of questionable quality, not to mention potentially carrying the risk of virus infection - although our *Watchdog* utility from last month's magazine will reduce the risk. However, all the software available on SID is of a high quality, and some of the items have been included on previous RISC User monthly discs, for example the window template editor FormEd, and the RISC OS Extras. The software ranges from complete Desktop applications to small utilities, and includes games, data files (e.g. sprites and Draw files) and demos.

The bulletin board area is a lively focal point for the exchange of information and opinion. Boards are provided on a number of topics, such as RISC OS, software, hardware, general comments, printers, PC Emulator, image manipulation and communications. The boards are used for posting messages, either to ask for, or to provide, help or to offer an opinion on topics of current interest. You can read through the messages on any or all of the boards, or post your own message with ease. Each time you log on you can elect to read all messages which have been posted since you last accessed SID, making it very easy to keep up with all that has gone on in the meantime.

El Sid
SERIOUS01
Serious Software - Archimedes
1. Splice from Ace Computing
2. FAM and GINO 2 new graphics packages
3. Knowledge Organiser from Clares
4. RISC OS Printer Driver from Ace
5. Artisan 2 from Clares
6. Euclid developments from Ace
Press - for more Software
0 for the El Sid menu

Some of the software to be found on SID

HOW TO ACCESS SID

Assuming you have the necessary hardware and software, you can dial up SID straight away on (0223) 243642. The database is in viewdata format on the standard V23 protocol (1200/75 baud, 7 bits, even parity, 1 stop bit). If you are a subscriber to Prestel or Micronet, however, it is much simpler, and unless you live near Cambridge much cheaper, to access SID through the Prestel gateway provided by using the keyword *SID.

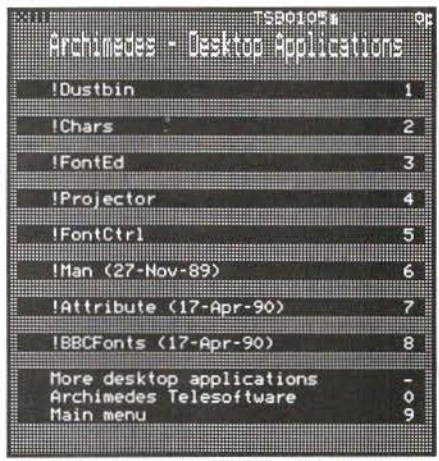
Once you are on SID, you will find it useful to download the map and print it out. You can find this via an option at the foot of the main menu page. The map will show you the structure of the database as well as the keywords to use for each area. Using these will often avoid having to travel via several levels of menu, so they can cut down your on-line time considerably. You can then browse around the rest of SID. Do read some of the bulletin board messages, as they will give you an idea of the topics which are currently being debated in the Acorn world, and of course, if you have a specific problem you can post your own message to ask for help. Many expert users as well as Acorn staff use SID so it is very likely that someone will reply before too long.

SOFTWARE

It is also a good idea to have a look at the software available for downloading. You will almost certainly find something useful. Most of the files are archived, which means they have been compressed to take up less space (and save your telephone bill!). Needless to say, a program for de-archiving the files, called *Sparkplug*, can also be downloaded.

EQUIPMENT

In order to gain access to any on-line service, including SID, you will need a modem and communications software. There are a number of inexpensive modems on the market but you do have to be careful to get the correct lead for the Archimedes. The wiring may differ from one modem to another, so make sure you obtain a lead which is specifically designed for the set-up you are using. Comms packages for the Arc are not as abundant as for other machines, but there are some good ones, including BEEBUG's own *Hearsay*.



Software reviews in El Sid

COSTS

Currently the cost of accessing SID is the price of a phone call to Cambridge if you dial direct. From Prestel it costs 11p per minute between 08.00 and 18.00, and 4p per minute at other times, though these figures include the standard Prestel time charge. Micronet members pay 8p per minute from 08.00 to 18.00, 2p per minute from 18.00 to 24.00, and 1p per minute at other times, again including standard time charges. All in all, SID is well worth a look. If anything happens in the Acorn world, SID will know about it! RU

Archimedes Software

Disc 7 - A New Chess Program for The Archimedes.

At last, a Chess program that takes full advantage of RISC OS. Chess is now a true RISC OS application, installing itself on the icon bar and running on the desktop in a window at the same time as other applications. This means you can carry on working with other programs whilst the Chess program is thinking of its next move.

Features: load and save games, edit board, step backwards and forwards through game, computer 'v' computer mode, play black or white, reverse board, save game setup. multiple levels, print game. Moves displayed in algebraic notation. Full mouse control over game, on screen clocks. Hint. Choice of piece when promoting pawn. New better design of board and pieces. Undo move.

A good chess game that fits beautifully into RISC OS.

Disc 22 - Novapaint 16 colour paint package.

Extensive paint package with Fontmaster two tone font system. user defined brushes, airbrush, auto-shader, colour fills. define graduated palettes. effects (pixel average, area squash/stretch/distort/rotate. sphere wrap, cylinder wrap. Online help, manual, 14 demo pictures and 24 fonts.

Disc 23 Desktop Applications

Disc of RISC OS !applications, 24 system fonts, sprites and Draw files. Includes !IFastdesk, !Backpict, !FileHelp, !CopyOpts, !FontFix, !Pointer(1-3), !RomSprite, !Indicator, !Saver, !SectCopy, !SoundOff, !Timer, !FormatTxt, !Aquarium.

Disc 24 - RISC OS Terminals

!TaskData and !TaskANSI multitasking RISC OS desktop terminals/ comms. programs for Viewdata and ANSI/VT100/VT52. Suit Prestel, bulletin boards and mainframes. Auto Logon scripts. CET and X/Y MODEM (batch) file transfer. !RS423State. CET coder. !SparkPlug.

Also available:

Disc 1	EMACS. Classic multi document editor with macro language. Includes full C source.
Disc 4	XLISP. Object oriented version of LISP with C source and progs. New 2.00 version.
Disc 5	C Toolkit. 20+progs for C programmers with sources. grep, awk, make, sed, more...
Disc 6	Kermit. Archimedes, BBC and MSDOS versions of file transfer/comms. prog.
Disc 8	CrossStar. Wimp based crossword solver with huge dictionary.
Disc 10	More C Tools. yacc and lex with examples and C source. New versions...
Disc 11	Little SmallTalk. Original object oriented language with C source, docs, programs.
Disc 14	GNU Tools#1. Quality tools with source. grep, egrep, sed, awk, diff. New versions.
Disc 15	Clip Art#1 50 black and white pictures, also 65 Epson LQ printer fonts, !Sparkplug
Disc 16	Spark. RISC OS file and directory archiver. !backdrop, pd. !apps. 1Mb colour pics.
Disc 18	MTV Raytracer. database driven 3D raytracing package with C source code.
Disc 19	Starchart. RISC OS program to make Draw file starmaps. Catalog of 9000 stars.
Disc 25	Vi Clones Two copies of the popular UNIX 'vi' editor with C sources and docs.

Each disc is £5.99 inc. Buy four claim another one free!

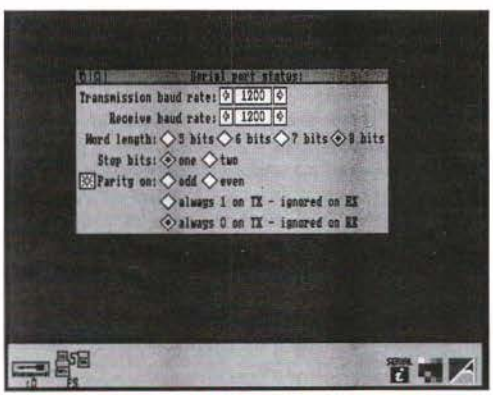
David Pilling, P.O. Box 22, Thornton Cleveleys, Blackpool. FY5 1LR.

Free Air Mail delivery on overseas orders. Full list available on request.

Wimp Applications Made Easy

If you are seeking a packaged approach to the writing of Wimp applications, then Mike Ironmonger's EasyWimp system may appeal.

You may have been following Lee Calcraft's detailed exposition on *Mastering the Wimp*, and the writing of Wimp applications, but even so the wealth of detail which has to be mastered can still be quite daunting. The approach here is to provide a ready-made Wimp application shell (called EasyWimp), for those applications which require just a single window to function. The user then needs to add just two procedures in order to create a complete Wimp application. However, the series of articles referred to above will provide an excellent background to the discussion here.


Transmission baud rate: 1200
Receive baud rate: 1200
Word length: 5 bits 6 bits 7 bits 8 bits
Stop bits: one two
Parity on: odd even
always 1 on TX - ignored on RX
always 0 on TX - ignored on RX

Screen display of the serial port application

The first procedure required will contain a series of simple calls to create the window and the various icons and icon groups to be displayed inside the window. EasyWimp then automatically handles all clicks and key presses over the icons. When any change occurs in them, it calls the second additional procedure to inform it of the new state of the icon/group. This is termed an *event*, and the user's code (in the second procedure) simply needs to respond to the new state of the icon/group with which the event is concerned.

The best approach to understanding this system is probably to type in the program listed here which consists of EasyWimp plus the additional procedures to form a complete Wimp application, in this case to monitor and change the serial port status (see also Volume 3 Issue 4).

As with any application, you need to start by creating an application directory, complete with a sprite file and a !Run Obey file. The easiest way to do this is to use the application shell generator published in RISC User Volume 3 Issue 2, assuming a default Wimp slot requirement of 32K. The user's code can then be added to the end of EasyWimp, which should then be saved in the application directory as *!RunImage*. In the case of the listing here, the entire program should be saved as !RunImage without further ado.

If you double click on the application's icon in a directory viewer it will install itself on the icon bar. Clicking with Select on its icon there will open its window on the screen. You can then experiment with changing the various options as a basis for the discussion which follows, and with a view to creating your own Wimp application.

The first of the two additional procedures (from line 2230 onwards) must be called PROCset_up, and this in turn will need to make calls to other procedures already existing in EasyWimp, the first of which should be to *PROCcreate_window*:

```
DEF PROCcreate_window(title$,W%)
```

This creates the titled window with a width of W% half characters (all X co-ordinates and icon widths supplied to the procedures are specified in units of half a character) - see line 2240.

Next come the calls to create the icons. These should be added in the order in which the icons are to appear in the

window, from top left to bottom right. Most of them are functions which return a unique group number so that when an event occurs the user knows which group the event is concerned with. As well as this, there are some parameters which must be specified which are common to several of the calls:

X%	the x co-ordinate of the icon.
Y%	the y co-ordinate of the icon in units of a character.

Both of these assume an origin at the top left-hand corner of the window.

text$	the text that appears in the icon.
title$	if not null, this title appears to the left of the icon/group.
opt$	a list of options separated by a comma and ending with a comma.
width%	the width of the icon.
tab%	the spacing between a set of icons.

The calls themselves are as follows:

DEF PROCtext(x%,y%,text$) - This creates a simple text icon with no border or background. Clicks on this text are ignored and no event is generated.

DEF FNonoff(X%,Y%,text$,on%) - This creates a text and sprite icon with the Desktop's *opt-on* or *opt-off* icon on the left and the text on the right. The parameter *on%* (TRUE or FALSE) determines which sprite is displayed initially, and clicking on any part of the icon reverses the state and generates an event. See line 2400 in the example.

DEF FNinput(X%,Y%,title$,init$, len%,width%) - This creates a writeable icon which accepts up to *len%* characters, and initially contains the string *init$*. A click on this icon causes the red caret to appear in the icon, and the text can then be edited. While editing, there are three keys which have special effects. Cursor-up and cursor-down will move the caret into the previous or next writeable icon without generating an event, while pressing Return generates an event which returns the string entered and then moves the caret to the next writeable icon.

DEF FNaction(X%,Y%,opt$,width%, tab%) - This creates a group of icons of the *menu* type. When the pointer is over one of these icons, the icon is inverted, and clicking on the icon will generate an event.

DEF FNradio(X%,Y%,title$,opt$, on%,tab%,indent%) - This creates a titled group of text and sprite icons with the Desktop's *radio-on* or *radio-off* sprites. The string *opt$* specifies the options, and if they go off the right-hand edge of the window they move down a line and start at an X co-ordinate of *indent%*. With *radio* buttons, only one of these icons will be on at any time, and initially that selected is specified by the value of *on%*. When the user clicks on one of the icons, it is selected and an event is generated. See lines 2340, 2370 and 2430.

DEF FNchoice(X%,Y%,title$,opt$, width%,on%) - This creates a group of three icons which allow the user to select any one of the options specified in *opt$*. Following the title is a left arrow, and then the current choice (initially *on%*), and a right arrow. When the user clicks on one of the arrow icons, the next choice in the list is displayed in the central icon, which then generates an event. See lines 2280 and 2300.

The second procedure, to which the user should add his own code, must be called *PROCevent*. The parameters passed to this by the built-in Wimp_Poll routine specify the icon/group with which the event is concerned and the new state of that icon/group as follows:

DEF PROCevent(group%,b1%,b2%, on%,string$)

group% - This is the group number of the icon/group concerned.

b1% - For *radio* and *action* groups this is the number of the icon in the group. For example, in a *radio* group of five options the first icon will be number zero and the

last number four. In *choice* icons *b1%* specifies the current choice, the first choice being numbered zero.

b2% - This is only used in *choice* icons, where it specifies the total number of choices available.

on% - This specifies whether the icon is selected (on) or not (off). It's only of relevance to on-off icons.

string$ - This is the string which the icon contains. For *input* icons this string will have been entered by the user, and for *choice* icons this will be the current choice. The easiest way to decode these parameters is with a CASE structure using *group%*. The WHEN statements of this should pick out the group with which the event is concerned, and call the relevant routine, user-written procedure or function, or an appropriate SYS call with any of the other parameters that the routine requires. See lines 2480 to 2530 in the example application. Note that this also includes references to an additional user-written procedure, PROCnew.

All the above may sound a little complicated, but as always it's much simpler to use than it is to describe. An inspection of the extra code of the example application should help clear up any points on which you're not sure.

We would be interested to receive any applications which readers might write based on Mike Ironmonger's EasyWimp with a view to publication in the magazine or on the magazine disc.

```
   10 REM             >$.!Serial.!RunImage
   20 REM Program     Serial port control
   30 REM Version     A 1.00
   40 REM Author      Mike Ironmonger
   50 REM RISC User   July/August 1990
   60 REM Program     Subject To Copyright
   70 :
   80 ON ERROR VDU4:PRINTREPORT$;" at li
ne ";ERL;", quitting.":END
   90 PROCinitialise
  100 ON ERROR PROCerror(ERR,REPORT$)
  110 :
  120 REPEAT
  130 SYS "Wimp_Poll",&81833,block% TO R
%
  140 CASE R% OF
  150  WHEN 2 : SYS "Wimp_OpenWindow",,b
lock%
  160  WHEN 3 : SYS "Wimp_CloseWindow",,
block%
  170  WHEN 6 : PROCbutton_click(block%!
8,block%!12,block%!16)
  180  WHEN 8 : PROCkey_press(block%!4,b
lock%!24)
  190  WHEN 9 : quit%=(!block%=0)
  200  WHEN 17,18 : quit%=(block%!16=0)
  210 ENDCASE
  220 UNTIL quit%
  230 SYS "Wimp_CloseDown"
  240 END
  250 :
  260 DEF PROCbutton_click(B%,W%,I%)
  270 CASE B% OF
  280  WHEN 1,4 : IF W%=-2 PROCopen_wind
ow ELSE PROCicon_click(B%,I%)
  290  WHEN 2 : IF W%=-2 SYS "Wimp_Creat
eMenu",,menu%,!block%-64,140
  300 ENDCASE
  310 ENDPROC
  320 :
  330 DEF PROCicon_click(B%,I%)
  340 PROCget_info(I%)
  350 CASE type% OF
  360  WHEN 1 : PROCnew_choice(b1%-1)
  370 ENDCASE
  380 PROCevent(group%,b1%,b2%,on%,text$
)
  390 ENDPROC
  400 :
  410 DEF PROCnew_choice(inc%)
  420 I%-=inc%:PROCget_info(I%)
  430 b1%=(b1%+inc%+b2%)MODb2%
  440 code%(I%)=(b2%<<16)+(b1%<<8)+group
%
  450 text$=FNget(choice$(group%),b1%)
  460 $block%!28=text$:PROCset_icon_stat
e(w_main%,I%,0,0)
  470 ENDPROC
  480 :
  490 DEF PROCget_info(I%)
  500 code%=code%(I%)
  510 group%=code%AND255
  520 b1%=(code%>>8)AND255
  530 b2%=(code%>>16)AND255
```

```
  540 type%=code%>>24
  550 !block%=w_main%:block%!4=I%
  560 SYS "Wimp_GetIconState",,block%
  570 on%=-((block%!24>>21)AND1)
  580 text$=FNstring(block%!28)
  590 ENDPROC
  600 :
  610 DEF PROCkey_press(I%,C%)
  620 CASE C% OF
  630  WHEN 13 : PROCicon_click(-1,I%):P
ROCmove_caret(I%,1)
  640  WHEN &18E : PROCmove_caret(I%,1)
  650  WHEN &18F : PROCmove_caret(I%,-1)
  660  OTHERWISE SYS "Wimp_ProcessKey",C
%
  670 ENDCASE
  680 ENDPROC
  690 :
  700 DEF PROCmove_caret(I%,dir%)
  710 REPEAT
  720  I%=(I%+dir%+icons%)MODicons%
  730 UNTIL code%(I%)<0
  740 PROCcaret_to(I%)
  750 ENDPROC
  760 :
  770 DEF FNstring(P%)
  780 A$=""
  790 WHILE ?P%>31
  800  A$+=CHR$?P%:P%+=1
  810 ENDWHILE
  820 =A$
  830 :
  840 DEF PROCset_icon_state(!block%,blo
ck%!4,block%!8,block%!12)
  850 SYS "Wimp_SetIconState",,block%
  860 ENDPROC
  870 :
  880 DEF PROCcaret_to(I%)
  890 SYS "Wimp_SetCaretPosition",w_main
%,I%,9999,,-1,-1
  900 ENDPROC
  910 :
  920 DEF PROCerror(!block%,$(block%+4))
  930 SYS "Wimp_ReportError",block%,1,ap
p$
  940 ENDPROC
  950 :
  960 DEF PROCinitialise
  970 DIM block% 255,menu% 99
  980 :
  990 SYS "OS_ReadVarVal","Obey$Dir",blo
ck%,256 TO ,,len%
 1000 P%=block%+len%-1:app$=""
 1010 REPEAT
 1020  app$=CHR$?P%+app$:P%-=1
 1030 UNTIL ?P%=ASC"!"
 1040 :
 1050 SYS "Wimp_Initialise",200,&4B53415
4,app$
 1060 M%=menu%:$M%=app$
 1070 M%!12=&70207:M%!16=100:M%!20=44
 1080 M%!24=0:M%!28=&80:M%!32=0
 1090 M%!36=&7000029:$(M%+40)="Quit"
 1100 B%=block%:!B%=-1:B%!4=0:B%!8=0
 1110 B%!12=68:B%!16=68:B%!20=&301A
 1120 $(B%+24)="!"+app$
 1130 SYS "XWimp_SpriteOp",24,,B%+24 TO
;E%
 1140 IF E%AND1 $(B%+24)="Application"
 1150 SYS "Wimp_CreateIcon",,B%
 1160 :
 1170 quit%=FALSE
 1180 group%=0:ESG%=1:miny%=0
 1190 larrow$=CHR$136:rarrow$=CHR$137
 1200 :
 1210 DIM b_onoff% 13:$b_onoff%="soptoff
,opton"
 1220 DIM b_radio% 17:$b_radio%="sradioo
ff,radioon"
 1230 DIM choice$(255),code%(999)
 1240 PROCset_up
 1250 :
 1260 B%=block%:!B%=0:B%!4=miny%-8
 1270 B%!8=width%*8+4:B%!12=0
 1280 SYS "Wimp_SetExtent",w_main%,B%
 1290 ENDPROC
 1300 :
 1310 DEF PROCtext(x%,y%,text$)
 1320 IF text$="" ENDPROC
 1330 PROCicon(-1,LEN(text$),text$,x%,y%
,LEN(text$)*2,44,&7000109,0,0,0)
 1340 X%=x%+LEN(text$)*2+1
 1350 ENDPROC
 1360 :
 1370 DEF FNonoff(X%,Y%,text$,on%)
 1380 PROCopt_icon(X%,Y%,b_onoff%,text$,
-(on%<<21),0)
 1390 group%+=1:=group%-1
 1400 :
 1410 DEF FNinput(X%,Y%,title$,init$,len
%,width%)
 1420 PROCtext(X%,Y%,title$)
 1430 PROCicon(-1,len%,init$,X%,Y%,width
%,48,&700F12D,128,0,0)
```

```
1440 group%+=1:=group%-1
1450 :
1460 DEF FNaction(X%,Y%,opt$,width%,tab
%)
1470 N%=0:A$=FNget(opt$,N%)
1480 REPEAT
1490  PROCicon(-1,LEN(A$),A$,X%,Y%,widt
h%,48,&C700912D+(ESG%<<16),0,0,N%)
1500  N%+=1:X%+=tab%
1510  A$=FNget(opt$,N%)
1520 UNTIL A$=""
1530 ESG%+=1:group%+=1:=group%-1
1540 :
1550 DEF FNradio(X%,Y%,title$,opt$,on%,
tab%,indent%)
1560 PROCtext(X%,Y%,title$):N%=0
1570 REPEAT
1580  A$=FNget(opt$,N%):L%=LEN(A$)*2+7
1590  W%=tab%:IF W%<L% W%=L%
1600  IF X%+W%>width% X%=indent%:Y%+=1
1610  IF A$<>"" PROCopt_icon(X%,Y%,b_ra
dio%,A$,(ESG%<<16)-((N%=on%)<<21),N%)
1620  X%+=W%:N%+=1
1630 UNTIL A$=""
1640 ESG%+=1:group%+=1:=group%-1
1650 :
1660 DEF FNchoice(X%,Y%,title$,opt$,wid
th%,on%)
1670 choice$(group%)=opt$
1680 tot%=-1:len%=0:P%=1
1690 REPEAT
1700  F%=INSTR(opt$,",",P%)
1710  IF F%-P%>len% len%=F%-P%
1720  tot%+=1:P%=F%+1
1730 UNTIL F%=0
1740 PROCtext(X%,Y%,title$)
1750 PROCicon(-1,1,larrow$,X%,Y%,4,48,&
700312D,1,0,0)
1760 PROCicon(-1,len%,FNget(opt$,on%),X
%+5,Y%,width%,48,&700012D,0,tot%,on%)
1770 PROCicon(-1,1,rarrow$,X%+6+width%,
Y%,4,48,&700312D,1,0,2)
1780 group%+=1:=group%-1
1790 :
1800 DEF PROCopt_icon(X%,Y%,ind%,A$,fla
g%,num%)
1810 PROCicon(ind%,LEN(A$),A$,X%,Y%,LEN
(A$)*2+6,44,&1700B113+flag%,0,0,num%)
1820 ENDPROC
1830 :
1840 DEF FNget(A$,N%)
1850 FORA%=0TON%
1860  L%=INSTR(A$,",")
1870  B$=LEFT$(A$,L%-1)
1880  A$=MID$(A$,L%+1)
1890 NEXT
1900 =B$
1910 :
1920 DEF PROCcreate_window(title$,W%)
1930 width%=W%:len%=LEN(title$)
1940 B%=block%:$B%=STRING$(88,CHR$0)
1950 !B%=640-W%*4:B%!8=9999:B%!12=884
1960 B%!28=&87000012:B%!32=&1000207
1970 B%!36=&C0103:B%!56=&119:B%!64=1
1980 DIM buf% len%:$buf%=title$
1990 B%!72=buf%:B%!76=-1:B%!80=len%+1
2000 SYS "Wimp_CreateWindow",,B% TO w_m
ain%
2010 ENDPROC
2020 :
2030 DEF PROCopen_window
2040 !block%=w_main%
2050 SYS "Wimp_GetWindowState",,block%
2060 block%!28=-1
2070 SYS "Wimp_OpenWindow",,block%
2080 ENDPROC
2090 :
2100 DEF PROCicon(ind%,len%,text$,X,Y,W
,H,flag%,type%,b2%,b1%)
2110 B%=block%:!B%=w_main%
2120 B%!4=X*8:B%!12=B%!4+W*8+4
2130 B%!8=-Y*56-56:B%!16=B%!8+H
2140 B%!20=flag%
2150 DIM buf% len%:$buf%=text$
2160 B%!24=buf%:B%!28=ind%:B%!32=len%+1
2170 SYS "Wimp_CreateIcon",,B% TO I%
2180 icons%=I%+1
2190 code%(I%)=(type%<<24)+(b2%<<16)+(b
1%<<8)+group%
2200 IF B%!8<miny% miny%=B%!8
2210 ENDPROC
2220 :
2230 DEF PROCset_up
2240 PROCcreate_window("Serial port sta
tus:",104)
2250 :
2260 A$="9600,75,150,300,1200,2400,4800
,9600,19200,50,110,134"+CHR$189+",600,18
00,3600,7200"
2270 SYS "OS_SerialOp",6,-1 TO ,t_rate%
2280 g_transmit%=FNchoice(1,0,"Transmis
sion baud rate:",A$,12,t_rate%)
2290 SYS "OS_SerialOp",5,-1 TO ,r_rate%
2300 g_receive%=FNchoice(11,1,"Receive
```

```
baud rate:",A$,12,r_rate%)
 2310 :
 2320 SYS "OS_SerialOp",1,-1 TO ,data_fo
rmat%
 2330 B%=3-data_format%AND3
 2340 g_word_length%=FNradio(3,2,"Word l
ength:","5 bits,6 bits,7 bits,8 bits,",B
%,0,0)
 2350 :
 2360 B%=(data_format%>>2)AND1
 2370 g_stop_bits%=FNradio(7,3,"Stop bit
s:","one,two,",B%,14,0)
 2380 :
 2390 B%=(data_format%>>3)AND1
 2400 g_parity_on%=FNonoff(1,4,"Parity o
n:",B%=1)
 2410 :
 2420 B%=(data_format%>>4)AND3
 2430 g_parity_num%=FNradio(28,4,"","odd
,even,always 1 on TX - ignored on RX,alw
ays 0 on TX - ignored on RX,",B%,14,28)
 2440 ENDPROC
 2450 :
 2460 DEF PROCevent(group%,b1%,b2%,on%,t
ext$)
 2470 CASE group% OF
 2480  WHEN g_transmit% : SYS "OS_Serial
Op",6,b1%
 2490  WHEN g_receive% : SYS "OS_SerialO
p",5,b1%
 2500  WHEN g_word_length% : PROCnew_for
mat(%11,3-b1%)
 2510  WHEN g_stop_bits% : PROCnew_forma
t(%100,b1%<<2)
 2520  WHEN g_parity_on% : PROCnew_forma
t(%1000,(-on%)<<3)
 2530  WHEN g_parity_num% : PROCnew_form
at(%110000,b1%<<4)
 2540 ENDCASE
 2550 ENDPROC
 2560 :
 2570 DEF PROCnew_format(bic%,eor%)
 2580 data_format%=(data_format%AND(NOTb
ic%))EOReor%
 2590 SYS "OS_SerialOp",1,data_format%
 2600 ENDPROC
```

RU

Base
5

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DTP Resources

Alan Wrigley looks at some recent software releases which provide fonts or artwork for use with a DTP package.

The proliferation of DTP packages for the Arc, together with a growing realisation that the computer is a powerful contender when it comes to choosing a system for DTP work, has encouraged the spread of software releases aiming to provide resources for this purpose. In this review, I shall be looking at a number of collections of clip art, a range of outline fonts which supplement those already available from Acorn, and a utility which enables you to manipulate outline font text in a way not possible with the standard tools.

MAPS OF THE WORLD

World Geography Maps (£29.95), from Micro Studio, is a two-disc set of Draw files containing outline maps of about 150 countries. Each map shows an outline of the country in black, with the capital city in red and other major cities in black. Large areas of water are shown in blue. Some larger countries, e.g. Australia and the USA, also have state boundaries marked. This appears to be a competent package, and should form a very useful library of basic images for anyone involved with geographical subjects.

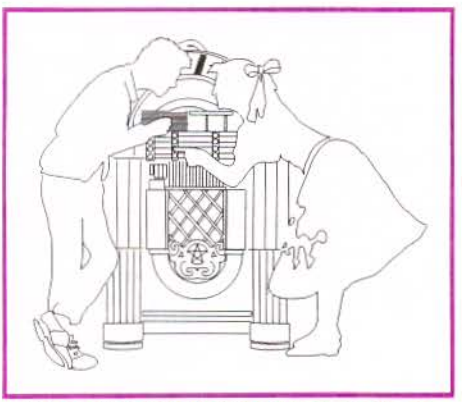
DTP_IMAGES

G.A.Herdman Educational Software has released seven discs packed with files of artwork, under the generic name of *DTP_Images* (£8.99 per disc, or £7.49 if more than one ordered at a time). Disc 1 contains a mixture of Draw and sprite files as well as digitised images, covering subjects such as road signs, maps, frame shapes etc. Disc 2 has sprite files of people, animals, maps, places and so on, plus Draw files on the subject of celebration. Disc 3 contains around 130 Draw files on scientific themes, for example electronic components, laboratory equipment and glassware, and scientific and OS map symbols. Disc 4 is primarily composed of heraldry images in Draw format, plus an excellent detailed picture of the Mallard locomotive. The main theme of Disc 5 is food, while on disc 6 you will find digitised sprites on a natural history theme. Finally disc 7 contains Draw and Sprite files on trees.

Some of the pictures on these discs I felt were rather simple and could just as easily be drawn in a couple of minutes by the user. Some others could perhaps benefit from more detail. But there are many worthwhile images on each disc, and taken as a whole, the set provides an inexpensive library of useful pictures which will cover a great many requirements.

MIDNIGHT GRAPHICS

A new collection of clip art has recently been released by Midnight Graphics. *Draw Format Clip Art* (£34.44) is a five-disc set, each one containing a full 800K of Draw files. The subject range covered is enormous, including animals, computer and office equipment, transport, food, maps, telephones, credit cards and people engaged in a wide range of activities, plus lots more. There are also useful items which can be dropped into a document, such as borders, arrows, shapes etc.



"Teens" from Midnight Graphics' clip art collection

Some images are monochrome and some colour, and most have been drawn to a very high standard. Some are straightforward pictures, some are stylised graphic images,

and a few introduce cartoon-style humour. Many of the drawings are highly imaginative. Certain images I felt lacked a degree of accuracy, and had not been drawn to the same degree of realism as some of the pictures on the Computer Concepts disc (mentioned below). However, there are so many useful items in this set that it represents excellent value, and must contain something of use for everyone.

In addition to the material covered here, at least two of the DTP packages have clip art bundled with them. Computer Concepts' Impression has a disc of Draw and Sprite files containing detailed, high quality images, and BEEBUG's Ovation also has a disc of artwork. Unlike other artwork packages, this is supplied as a set of pages of images, each on a related theme, any of which can be imported directly onto the clipboard for incorporation into a document.

FONTS

Just as independent companies are finding it worthwhile to produce discs of artwork, so the same thing is beginning to happen with fonts. Electronic Font Foundry has had a range of fonts available for a little while now, and is currently extending the range. The price for a single font is £10.92, but there is a range of discounts on larger quantities. For example, 2 or 3 fonts from the same family will cost £9.14 each, a complete font disc (which may contain 17 to 21 fonts) costs from £98.61 to £114.88 depending on which disc you buy, and a complete set of 112 fonts costs £513.91.

The range includes some fancy fonts as well as the more conventional ones you would expect to find. They are claimed to be compatible with Acorn's outline fonts, and in fact the review samples I looked at appeared to work faultlessly with both Ovation and Impression. They will not, however, load into Acorn's FontEd, though I suspect that this is by design, to prevent tampering with them, rather than any incompatibility.

There are a few things to consider when purchasing fonts. Firstly, are they hinted and scaffolded? If not, you may have problems displaying and printing them correctly at certain sizes. Secondly, are they PostScript compatible? You may not have a PostScript printer at present, but it would not be much use preparing documents using non-PostScript fonts which might at some time in the future be printed on one.

The fonts supplied for review were Sophie, Oxford and Warsaw, all of which have PostScript equivalents, and a novel font called Fancy Dress, which is illustrated in this article. The total range supplied by EFF covers a wide variety of styles, including versions of all the most widely used fonts. The fonts appear to be hinted and scaffolded, although at some sizes I could detect discrepancies in the heights of some characters on the screen, though when printed on a laser printer at various resolutions everything seemed to be correct. However, the character widths are not quite PostScript compatible, which means that if you are printing on a PostScript printer, you may find that the text does not occupy the same space as on screen. EFF is apparently negotiating with Adobe Systems and hopes to be able to announce 100% PostScript compatibility soon, so it is to be hoped that some attention will be given to this point.

EFF's Fancy Dress font, sloped using FontFx

In addition to the EFF fonts reviewed here, there are of course Acorn's own fonts

which are supplied with the Acorn Desktop Publisher, and BEEBUG also has a range of fonts available.

FONT EFFECTS

FontFx (£9.95) is a utility produced by Data Store Software. It allows you to input a line of text in any outline font installed in the machine, which it then outputs as a Draw file. However, this is not all it does. The text can be scaled, rotated, sloped at a specified angle, arranged in a circle, arc or column; a shadow can be added, either behind or below, the outline thickness can be altered and different colours chosen. All of this is very easy to achieve using a series of dialogue boxes within the main window. When all the effects have been chosen and the file created, the image can be further manipulated in Draw before being imported into a DTP package.

Image produced by manipulating text with FontFx

FontFx also has a command language, which enables you to prepare script files using Edit for processing by FontFx. This file will contain FontFx commands as well as text to be treated, and can be dragged into FontFx to be processed.

FontFx is a most useful utility, but you cannot see the effect you are creating on the screen. To do this you must save the file and then load it into Draw. This can be a nuisance on a 1 Mbyte machine, but it is worth the trouble as you can do things with text that are simply not possible using Draw alone - text in Draw can only be handled horizontally.

The version I reviewed (3.20) had a couple of faults, but Data Store do regularly update the software as soon as any problems are discovered. In fact, the most serious bug I encountered was sorted out on the telephone in a couple of minutes, and was immediately incorporated into the latest version there and then.

New products in this field are coming out all the time, and there is a much wider range than has been covered here. In addition to those products produced specifically for the Archimedes market, a large quantity of clip art packages has been available for PCs and other computers for some while. Some of this material can be used on the Arc, provided that it is in the correct format. Acorn's very useful utility ChangeFSI (included on the RISC User Volume 2 Issue 10 monthly disc) will covert several formats to sprite files, and some DXF files can be directly imported into Draw.

Product World Geography Maps
Supplier Micro Studio
22 Churchgate Street
Soham, Ely
Cambridgeshire CB7 5DS
Tel. (0353) 720433

Product DTP_Images (discs 1-7)
Supplier G.A.Herdman Educational Software
43 Saint Johns Drive
Clarborough, Retford
DN22 9NN
Tel. (0777) 700918

Product Draw Format Clip Art
Supplier Midnight Graphics
5 Victoria Lane, Whitefield
Manchester M25 6AL
Tel. 061-766 8423

Product Outline Fonts
Supplier The Electronic Font Foundry
Bridge House
18 Brockenhurst Road
Ascot SL5 9DL
Tel. (0990) 28698

EFF fonts are also available from:
Ian Copestake Software
10 Frost Drive, Wirral
Merseyside L61 4XL
Tel. 051-648 6287

Product FontFx
Supplier Data Store Software
6 Chatterton Road, Bromley
Kent BR2 9QN
Tel. 081-460 8991

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French Light Book

French Demi-Bold Bold

Europe Light Medium **Ultra Bold**

FANCY Dress Party

Poster *Sophie* ***Tamsin***

Warsaw Ultra Bold

Italian Book *Oblique*

These are just a few typefaces selected from over 100 available now. They can be used with any DTP program and may be mixed freely with other fonts.

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Assembler Workshop

Writing applications

David Spencer explains how to write applications in ARM code.

Programs running under RISC OS (excluding interrupt handlers and other low-level nasties) can be divided into two broad types - those that are applications, and those that are not. For the purpose of this article we shall refer to non-applications as utilities, because many of them perform utility type operations. In this article we shall look at writing applications in ARM code, both as stand-alone programs, and as relocatable modules. In next month's *Assembler Workshop* we will look at the special problems involved in implementing multi-tasking Desktop applications as modules.

Before delving into details, we need to be clear about what exactly is an application, and what is a utility. Intuitively, it is clear that a DTP package or spreadsheet is an application, while a disc formatter, for example, isn't. However, actually defining an application is not so straightforward. One view is that an application is the main task in control of the computer, while utilities are secondary tasks that can be called by the application. This view ties in with the way in which RISC OS views applications and utilities. To the operating system, utilities, whether they be module star commands or disc-based transient utilities, are subroutines that are called when needed, and exit using an instruction along the lines of MOV PC,R14.

Applications on the other hand are very different. Once an application has been started by RISC OS it is very much on its own and free to do what it wants. An application is not allowed to return to RISC OS in the same way as a utility. Instead, a call to SWI "OS_Exit" must be made, which calls a piece of code known as the *exit handler*. We will come back to this in detail later, but for the time being it is sufficient to know that the default action when an application exits is to return to the supervisor star prompt if outside the Desktop, or simply kill the application if in a multi-tasking environment. Applications must generate errors directly by calling SWI "OS_GenerateError", and must also handle errors returned by any utilities they call. Again, we will look at this in detail later.

APPLICATION WORKSPACE

As we have already mentioned, there are two main types of application - those implemented as stand-alone programs and those that are in the form of a relocatable module. In both cases, the application has available all the RAM that hasn't been claimed by the screen, RMA, operating system workspace etc. This RAM is mapped to start at address &8000 and the end address will depend on how much RAM is free. In addition, a module application can claim workspace in the RMA just like any other module. Outside of the Desktop, only one application can be active at a time, and hence all of the application memory is available to it. In the multi-tasking Desktop, the situation is different as all the applications must compete for the available memory. In this case, the task controller which forms part of the Wimp maintains a heap of free memory. When an application is started it is allocated the memory it needs from this heap. Any application can subsequently claim more memory, or return unused memory to the heap. However, even with this arrangement, the memory is remapped as needed to ensure that each application's workspace still starts at address &8000.

THE APPLICATION ENVIRONMENT AND HANDLERS

Each application runs in a particular environment, which defines factors such as the amount of available memory, and the action taken when the application quits. Whenever an application is started, its environment is set up by the caller. In a multi-tasking situation, each application has its own environment, and the Wimp switches automatically between them.

A major part of an application's environment is a set of routines called *handlers*. These are routines which are called when exceptional events occur, such

as an address exception, the Escape key being pressed, or the program quitting. Full details of handlers can be found in the *Program Environment* chapter of the PRM. However, for now, the only handlers we need to consider are the error handler, which is called when an error occurs, the escape handler which is called when the Escape key is pressed, and the exit handler, which is called when SWI "OS_Exit" is executed.

These handlers are set up using the call SWI "OS_ChangeEnvironment". Register R0 should contain the handler number, which is 6 for the error handler, 9 for the escape handler and 11 for the exit handler, and R1 should contain the address of the routine. R2 can optionally contain a workspace pointer that is passed to the handler routine when it is called, and for the error handler R3 must point to a buffer in which to store the error message. For full details, see the documentation of this call in the PRM.

STARTING APPLICATIONS

The most common way of starting an application is by running a file that has filetype &FF8 (Absolute). RISC OS will automatically load such a file at address &8000 and start it executing as an application.

A second way to start an application is to run a file that has the old style load and execution addresses, rather than a filetype. In this case, instead of loading the application at &8000, it is loaded at the load address specified with the file, and execution is started at the execution address. Another way to start an application is to use the command *GO which will run an application already in memory. If no argument is given then the execution starts at &8000, whereas an optional address can be given to force execution from a particular point. Incidentally, it follows from what was said earlier that none of these calls ever return as the application takes over.

When an application is entered, it cannot rely on any of the processor registers being set to useful values. In particular, the stack pointer (R13) does not point to a suitable area of stack memory. It is up to the application to select an area of memory and set up a stack. It is conventional to start the stack at the very top of the application workspace and have it grow downwards, although this is not mandatory. The ARM processor is at this point in user mode (see the *Assembler Workshop* in RISC User Volume 3 Issue 4), and therefore the stack you set up will be exclusive to your own application - it will not be used by any operating system routines.

There remains the problem of finding out exactly how much application memory there is, so that you can work out where to position the stack. This information can be found using the call SWI "OS_GetEnv", which is short for get environment. The call takes no parameters and returns the following results:

```
R0 = Address of star command
R1 = RAM limit
R2 = Address of start time
```

The result which particularly interests us is R1, which contains the maximum usable address plus one. R0 points to the star command used to invoke the application, and this can be used to read any parameters given on the command line. Register R2 points to a five byte value that is the time the application started in centiseconds from the start of the century (00.00 hrs on 1st January 1900).

MODULE APPLICATIONS

So far, we have looked mainly at applications that are loaded into main memory. When it comes to module-based applications, much of the material is the same, though there are some subtle differences.

We have already mentioned that a module-based application can use either the application workspace, or claim its own in the RMA. To an extent, the choice is somewhat arbitrary. Basic uses the application workspace for storing the current program, plus its own working variables and the stack, and doesn't claim any RMA at all. It could equally well have used the application area solely for the program, and claimed some extra memory for the stack and its own variables.

The method of starting a module is also different. Instead of a direct call, the module is entered using the offset at the start of the module header. Details of this process can be found in the *Modules* chapter of the

PRM. It is conventional for a module-based application to include a star command to start it. In this case, the only action the command needs to take is to call SWI "OS_Module" with a reason code of 2. This call enters the module as an application, and hence does not return. Again, for full details refer to the PRM.

Exiting a module-based application is done using SWI "OS_Exit", just as for a normal application. There is however, another useful call - SWI "OS_ExitAndDie". This performs the function of SWI "OS_Exit", but also kills the module as well.

A SAMPLE APPLICATION

To end this month, we present a simple application program. The function of the program is rather contrived, to show as many of the aspects covered as possible. Running the program will assemble the application and save it with the filename 'Repeat'. If you run it using *Repeat, you will be prompted to enter a string. This is then printed out continually until Escape is pressed. The application terminates when a null line is entered, and gives an error if the line is longer than thirty characters.

On entry, the application sets up its own error and escape handlers. The first of these displays the error message and returns to the prompt stage, while the escape handler simply sets a flag that is tested by the foreground printing loop. The application also sets up its own exit handler. The reason for this is that on exit, the error and escape handlers should be set back to what they were on entry. This can be done by installing our own exit handler which restores the old error, escape and exit handlers, and then calls SWI"OS_Exit" again to actually quit the application. This should become clearer if you examine the program. This month's magazine disc contains both the application as presented here, and a module-based version of it. Next month we look at multi-tasking applications - particularly those written as modules.

```
10 REM > RepeatSrc
20 DIM code 400
30 FOR pass=12 TO 15 STEP 3
40 P%=&8000:O%=code:L%=O%+400
50 [OPT pass
60 ; Find memory limit and set stack
70 SWI "OS_GetEnv":MOV R13,R1
80 ; Set up handlers
90 MOV R4,#&9000:MOV R0,#6
100 MOV R2,#&9100:MOV R3,R2
110 ADR R1,error:SWI "OS_ChangeEnviron
ment":STMIA R4!,{R0-R3}
120 MOV R0,#9:ADR R1,escape
130 MOV R2,#&9000:ADD R2,R2,#&80:SWI "
OS_ChangeEnvironment":STMIA R4!,{R0-R3}
140 MOV R0,#11:ADR R1,exit
150 MOV R2,#&9000:SWI "OS_ChangeEnviro
nment":STMIA R4!,{R0-R3}
160 :
170 ; Main program loop
180 .main MOV R0,#0:MOV R1,#&9000
190 ADD R1,R1,#&80:STR R0,[R1]
200 SWI "OS_WriteS":EQUW &D0A
210 EQUS "Enter line ":EQUB 0
220 MOV R0,#&9200:MOV R1,#&100
230 MOV R2,#32:MOV R3,#&FF
240 SWI "OS_ReadLine":BCS esc
250 MOV R0,#&9200
260 MOV R2,#0:STRB R2,[R0,R1]
270 CMP R1,#0:SWIEQ "OS_Exit"
280 CMP R1,#30:ADRHI R0,toolong
290 SWIHI "OS_GenerateError"
300 .prt MOV R0,#&9200:SWI "OS_Write0"
310 SWI "OS_NewLine"
320 MOV R2,#&9000:ADD R2,R2,#&80
330 LDR R2,[R2]:TEQ R2,#0:BEQ prt
340 .esc MOV R0,#&7E:SWI "OS_Byte"
350 B main
360 .toolong EQUD 0
370 EQUS "Line too long":EQUB 0
380 :
390 ; The handler routines
400 .escape MVN R0,#1:STR R0,[R12]
410 MOVS PC,R14
420 .error
430 ADD R1,R0,#8:SWI "OS_NewLine"
440 .err2 LDRB R0,[R1],#1:CMP R0,#0
450 BEQ err3:SWI "OS_WriteC":B err2
460 .err3 SWI "OS_NewLine":B main
470 .exit LDMIA R12!,{R0-R3}
480 SWI "OS_ChangeEnvironment"
490 LDMIA R12!,{R0-R3}
500 SWI "OS_ChangeEnvironment"
510 LDMIA R12!,{R0-R3}
520 SWI "OS_ChangeEnvironment"
530 SWI "OS_Exit"
540 ]NEXT
550 SYS "OS_File",10,"Repeat",&FF8,,co
de,O%
```

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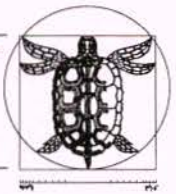

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Archimedes Voice Generator from MJD

Reviewed by Mike Williams

This package from MJD Software provides a comprehensive (some may even argue complex) solution to the creation of voice modules, by editing amplitude and pitch envelopes, waveforms and sound samples. *Archimedes Voice Generator* (AVG) is catering for a relatively specialised market, which may account for its total abandonment of the Wimp environment. If one accepts the decision the designers of AVG have made here, then the menu screens are well laid out, easy to use (with some minor criticisms), and form a readily understood menu structure. However, I feel that it is regrettable that accepted RISC OS standards have not been used.

The package consists of two discs and a 60 page menu. You may need to reconfigure your system before loading the software from the Systems Disc (following guidelines given in the manual). I had to perform a complete reset on my A310 before it would load. You are then prompted to insert the Data Disc from which a library of sample envelopes and waveforms is loaded.

The main menu screen shows five options covering *Real-time Synthesis, Interpolation Editor, Harmonic Envelope Editor, Sample Editor* and *Disc Management*. We will look at each of these in turn.

Real-Time Synthesis allows the user to create and edit amplitude and pitch envelopes and waveforms. The menu screen for this feature displays a number of icons and messages. The *Create* option allows any combination of waveform and pitch and amplitude envelopes to be combined to form a voice. A *note* icon allows a sound to be played, or more usefully, a (musical) *keyboard* icon turns the bottom rows of the Arc's keyboard into a musical keyboard, with a choice of four octaves. Unfortunately, you have to exit from this keyboard if you want to change the current voice (and this annoyance applies to all other edit screens where this facility is available).

Up to eight voices can be created and saved as a sound module. These voices can then be used with the Maestro application, or any other software using voices. The default library, loaded at the outset, contains 18 waveforms, 15 amplitude envelopes and 14 pitch envelopes. Each sound library of this kind can contain up to 20 examples of each.

To edit (or create) an amplitude envelope, you click on the appropriate icon. A further screen appears with a large graph display (of the envelope), and various control icons. Rubber-banding is used to create envelopes. You can also specify any part of the envelope to be repeated for as long as the note is being played (key pressed). All of the features of the envelope can be changed or removed, and you can cycle through all the amplitude envelopes in the currently loaded library from this screen.

Pitch envelopes cam be similarly created and edited. Again part of the envelope can be specified as a loop. In addition the vertical scale of the envelope can be in terms of semi-tones, or octaves.

The waveform editing screen is different from the two already described. It shows on screen all 20 waveforms from the currently loaded library (marked blank where appropriate). Furthermore, waveforms can be defined either in terms of harmonics or by means of a hand-drawn waveform - and the sample library includes both. The screen display changes according to the method by which a waveform is to be (or was) defined. If harmonics are used, then the equivalent graph is shown as well. Harmonically created waveforms are always mirrored about the fundamental, but hand-drawn waveforms can be mirrored or not as the user wishes.

Again, whatever format is used, all waveforms can be edited and changed as

required. Hand-drawn graphs can be created with rubber-banding, or continuous drawing (or a combination of both).

The second main menu option is called the *Interpolation Editor*. The function of this can be explained by analogy with cartoon animation, whereby intermediate frames are automatically generated between two main frames, a process often called *inbetweening*. Here, one waveform can be transformed into another to give moving colour to a sound (just as an amplitude envelope gives moving volume, and the pitch envelope gives moving frequency). In practice, two or more points in an amplitude envelope are selected and associated with specified waveforms. Selecting *Confirm* causes the interpolation to take place. Further amplitude envelopes and selected waveforms can be combined with the first interpolation.

The sound created with the Interpolation Editor is saved as a *Sound Data Block* (SDB). This is the common data structure used throughout AVG, and is equivalent to a sound sample at 20.833 KHz. SDBs can be used with the Sample Editor (qv) to create voice modules.

The third main menu option, the *Harmonic Envelope Editor*, provides a similar function to the Interpolation Editor just described but in terms of harmonics. In effect, a separate amplitude envelope is applied to each harmonic in the waveform.

An important function of AVG is the *Sample Editor*. An example SDB loaded from the Data Disc is first shown as a time/amplitude graph. This can also be viewed as a sequence of waveforms. Each waveform in the sequence can be displayed separately on a graph and edited directly as with the waveform editor. As well as editing SDBs, the Sample Editor can also load genuine sound samples and convert them into SDBs for further editing. Such samples must also be tuned to the Archimedes on-board Voice module pitch standard, before conversion to an SDB, another facility provided by AVG.

All samples saved in the form of an SDB can then be used to create a voice module, either in multi-voice format with up to eight voices per module, or in multi-layered format where a single voice is assigned the whole module as eight samples exactly one octave apart. In the latter case, the sample nearest in pitch to that of the note being played is used at any time.

Because AVG is not a multi-tasking Wimp application it must provide all its own disc management facilities. These appear partly in each of the options already described for the saving and loading of libraries, SDBs and voice modules, and also in the fifth option, *Disc Management*, in the main menu. There is also a very comprehensive on-line help system, again custom written for AVG.

CONCLUSIONS

As I hope you will appreciate, AVG provides a tremendous wealth of facilities for voice creation. This is quite daunting initially, and the manual must be read carefully if all the features are to be understood. The manual is tutorial in approach, and makes extensive use of the supplied libraries and example SDBs. However, one of the manual references seems incorrect, and there is the occasional minor hiccup in the software, though never anything too catastrophic.

I feel that even after several hours of working with this software I have only scratched the surface of what it is possible to achieve. If you want to extend the in-built range of voices, play around with sound samples, or create highly sophisticated acoustic effects then I do not believe you can do better than use AVG. It's not the easiest of packages to master, but I have seldom seen one which is so comprehensive and has so much to offer in its field.

Product	*Archimedes Voice Generator*
Supplier	*MJD Software* *13 Burnham Way,* *West Ealing,* *London W13 9YE.* *Tel. 081-567 4284*
Price	*£59.95 (VAT not applicable)*

Stepped Renumber

Alan Wrigley presents a utility which will smarten up your listings.

Some while ago, BEEBUG magazine published a utility for the BBC micro to renumber a Basic program in stages, with initial REM lines starting from line 10, the main program from line 100, and procedures from line 1000 onwards. The *StepNum* utility presented here does the same thing for the Archimedes. It will operate on any Basic program in memory, and has been designed so that it can be easily used with our *BEdit* application (RISC User Volume 3 Issue 4) which provided a Wimp front end for the Basic editor. However, StepNum will work perfectly well without BEdit.

The listing given here is the source code which assembles and saves a machine code utility. Type in the listing, then save and run it. The machine code will be assembled and filed as StepNum. If you wish to use it from BEdit, you should place this file within BEdit's application directory, and add the following line to BEdit's !RunImage program:

```
1585 *Key8 <0><&94>REN.|M*/<BEdit$Dir>.StepNum|M
```

Pressing Shift-Ctrl-F8 within the Basic editor will run StepNum and return to Basic.

Alternatively, you can file StepNum in the library directory of the current disc and invoke it from Basic by typing *StepNum.

HOW IT WORKS

One of the difficulties in renumbering any program is the way in which references to line numbers are made following a GOTO or a RESTORE statement. For very good reasons, which we will not go into here, these numbers are tokenised into 4 bytes, the first of which always has a value of &8D. When renumbering, these references must be found, and the new line number tokenised and inserted in place of the old. StepNum does this by scanning through the program in the first instance looking for tokenised numbers. When it finds one, the number is detokenised and stored in the utility's workspace, together with the address at which it is located in the program. There is enough space for 128 GOTOs or RESTOREs - should your program contain more than this a "no room" error will be generated.

Having compiled a list of tokenised numbers, the utility then goes through the program again line by line, looking at the first program character on each line (i.e. spaces are ignored). A flag is incremented when the first line not starting with REM is found, and incremented again when the first DEF is found. The new line number is calculated, numbering in increments of 10 from 10 while the flag is zero, from 100 while it is 1, and from 1000 while it is 2, unless 100 or 1000 respectively has already been used, in which case the next available increment of 10 is used.

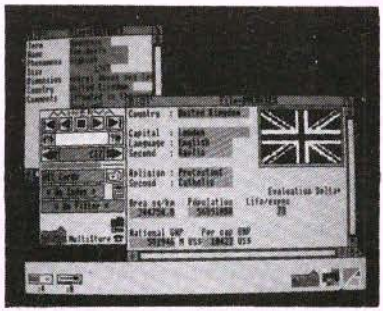
The old number is then checked against the list of tokenised numbers, and if any matches are found, the new number is tokenised and inserted in place. Finally the current line is correctly renumbered.

StepNum does not trap non-existent tokenised line numbers, i.e. GOTO nnnn where nnnn does not exist. It is a good idea in any case to perform a standard renumber using the Basic command RENUMBER before running StepNum, to ensure that the program has sensible line numbers to start with. The call from BEdit listed above does this. Any non-existent line numbers will be reported at this point by Basic.

PAGE, as set in line 140, is &8F00 by default but cannot always be guaranteed. For more information on PAGE, see this month's Hints & Tips.

This month's magazine disc contains a modified version of BEdit incorporating the facility to call StepNum as described above, and also including the amendments detailed in last month's Hints & Tips to print out listings from the Basic Editor using PCol.

```
 10 REM             >SNsource
 20 REM Program     Stepped Renumber
 30 REM Version     A1.2
 40 REM Author      Alan Wrigley
 50 REM RISC User   July/August 1990
 60 REM Program     Subject to copyright
 70 :
100 pc=15:link=14:sp=13:base=12
110 flag=11:new=10:old=9:con=8:ad=7
120 reg=6:len=5:blk=4:mod=3
130 start=2:env=1:gen=0
140 DIM code% 1000:max%=20:page=&8F00
```



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- THE GRAPHICS

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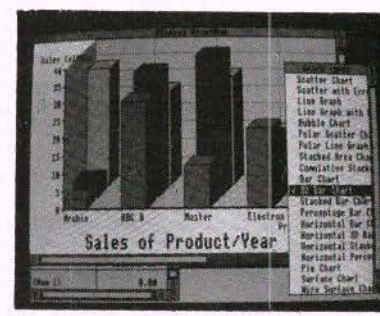

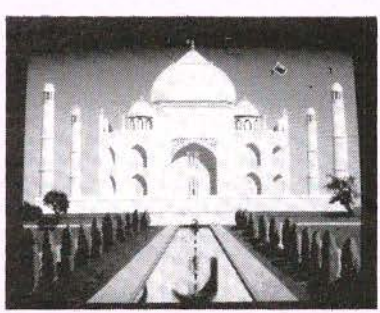

ATELIER

- THE STATE OF THE ART

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```
150 FOR I%=4 TO 7 STEP 3
160 P%=0:O%=code%
170 :
180 [OPT I%
190 STMFD (sp)!,{link}:MOV flag,#1
200 MOV gen,#15:MOV env,#0
210 SWI "XOS_ChangeEnvironment"
220 BVS exit:MOV reg,env:MOV gen,#18
230 ADR env,basic:SWI "XOS_Module"
240 BVS exit
250 CMP reg,mod:ADRCC gen,notbas
260 BCC exit:LDR gen,[mod,#-4]
270 ADD mod,mod,gen:CMP reg,mod
280 ADRCS gen,notbas:BCS exit
290 MOV start,#page:MOV len,#1
300 MOV blk,base
310 .detok
320 BL getline:BEQ number
330 .readloop
340 LDRB gen,[ad],#1
350 CMP gen,#13:BEQ detok
360 CMP gen,#229:CMPNE gen,#247
370 BNE readloop
380 .skip
390 LDRB gen,[ad],#1:CMP gen,#32
400 BEQ skip:CMP gen,#141:BNE readloop
410 STR ad,[blk],#4:LDRB gen,[ad],#1
420 MOV gen,gen,LSL#2:AND reg,gen,#&C0
430 LDRB con,[ad],#1:EOR reg,con,reg
440 STRB reg,[blk],#1:LDRB con,[ad],#1
450 EOR reg,con,gen,LSL#2
460 STRB reg,[blk],#3:SUB gen,sp,#8
470 CMP blk,gen:ADRGE gen,noroom
480 BGE exit:B readloop
490 .number
500 MOV start,#page:MOV flag,#0
510 MOV new,#0:MOV len,#1
520 STR new,[blk]
530 .numloop
540 BL getline:MOVEQ flag,#0:BEQ exit
550 .first
560 LDRB gen,[ad],#1
570 CMP gen,#32:BEQ first
580 CMP flag,#0:BNE main
590 CMP gen,#&F4:CMPNE gen,#58
600 BEQ check
610 MOV flag,#1:MOV new,#90
620 CMP new,old:MOVLT new,old
630 .main
640 CMP flag,#1:CMPEQ gen,#&DD
650 BNE check:MOV flag,#2
660 MOV new,#1000:SUB new,new,#10
670 CMP new,old:MOVLT new,old
680 .check
690 ADD new,new,#10:MOV blk,base
700 .checkloop
710 LDR ad,[blk],#8:CMP ad,#0
720 BEQ store:AND gen,old,#&FF
730 LDRB reg,[blk,#-4]:CMP reg,gen
740 MOVEQ gen,old,LSR#8
750 LDREQB reg,[blk,#-3]
760 CMPEQ reg,gen:BNE checkloop
770 MOV con,#&40:AND reg,new,#&3F
780 ORR reg,reg,con:STRB reg,[ad,#1]
790 MOV reg,new,LSR#8:AND reg,reg,#&3F
800 ORR reg,reg,con:STRB reg,[ad,#2]
810 AND reg,new,#&C0:MOV gen,new,LSR#8
820 AND gen,gen,#&C0
830 ORR reg,reg,gen,LSR#2
840 EOR reg,reg,#&50
850 ORR reg,con,reg,LSR#2
860 STRB reg,[ad]:B checkloop
870 .store
880 STRB new,[start,#1]
890 MOV reg,new,LSR#8
900 STRB reg,[start]:B numloop
910 .getline
920 ADD start,start,len
930 LDRB reg,[start,#-1]:CMP reg,#13
940 ADRNE gen,badprog
950 MOVNE flag,#1:BNE exit
960 LDRB old,[start]:CMP old,#255
970 LDRNEB reg,[start,#1]
980 ADDNE old,reg,old,LSL#8
990 LDRNEB len,[start,#2]
1000 ADDNE ad,start,#3:MOV pc,link
1010 .exit
1020 CMP flag,#0:LDMEQFD (sp)!,{pc}^
1030 LDMFD (sp)!,{link}
1040 ORRS pc,link,#1<<28
1050 .basic
1060 EQUS "BASIC":EQUB 0:ALIGN
1070 .badprog
1080 EQUD 0:EQUS "Bad program"
1090 EQUB 0:ALIGN
1100 .noroom
1110 EQUD 0:EQUS "No room for renumber"
1120 EQUB 0:ALIGN
1130 .notbas
1140 EQUD 0:EQUS "Not a Basic program"
1150 EQUB 0:ALIGN
1160 ]
1170 NEXT
1180 SYS "OS_File",10,"StepNum",&FFC,,c
ode%,O%
1190 END
```

RU

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Introducing C (Part 2)

David Spencer looks at choosing and using a C compiler.

Following last month's introduction to C, this time we look at the choice of C compilers and explain how to go about using one when you have purchased it - a task which may seem rather involved to a programmed used to Basic.

CHOOSING A COMPILER

There are currently two C compilers available for the Archimedes. The first is ANSI C from Acorn which is now in its third version. The alternative is Beebug's own ISO C. We will start by looking at the features of the two compilers, and then give an example of their use.

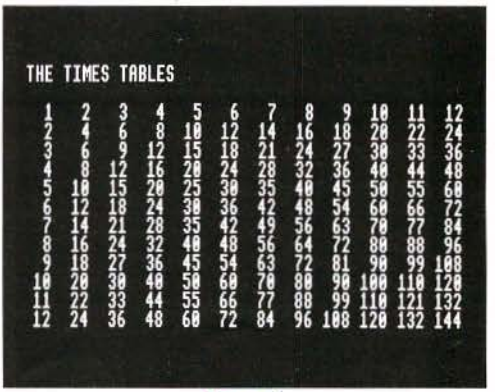

Figure 1

Fundamentally, both compilers perform the same functions. They both conform to the final ANSI standard as closely as possible, and both include the RISCOS_LIB library functions mentioned in the previous article. There are however some major differences between the two packages.

Perhaps the most striking difference is that Acorn ANSI C is command line driven, while ISO C runs under the Wimp in addition to the command line.

As well as the compiler and linker, ANSI C also includes a *make* utility and symbolic debugger, both of which are described later, and also various utilities to convert to and from the older Kernighan and Ritchie C standard. There is also a special assembler, called Cmhg, which allows relocatable modules to be written in C. However, the one essential that ANSI C does not include is a text editor to allow the source code to be entered in the first place. This is not a major problem though, as all users will have a suitable editor in the form of RISCOS *Edit*. You may also be able to use your favourite word processor or DTP package, provided that it can save a document as plain text with no embedded control codes.

If you are using ANSI C to develop major applications, it may be wise to consider Acorn's *Twin*. This is a special twin-window editor which allows up to twenty different documents to be loaded, and any two displayed simultaneously. A very useful feature of *Twin* is that you can use one of the windows to run the compiler in, while viewing the source code in the other window. When compilation errors occur, you can automatically cross reference into the source code. *Twin* is not Wimp-based, and many of its features can be performed using *Edit*'s Task Window facility. However, many programmers prefer *Twin*.

The ISO C Desktop environment includes its own editor, which is similar in operation to *Edit*. Text is entered as per normal, and text files can be loaded, saved, or transferred to other applications. However, the real advantage is that pressing the Menu button over the editor window brings up a menu allowing the program to be compiled, linked and even run. All the compiler and linker options can also be set via a submenu, alleviating the need for lengthy commands to be typed in with flags for various options. Furthermore, after an unsuccessful compilation, the lines in which errors occurred can be highlighted in the editor window automatically.

One area where Acorn's ANSI C excels is that of code optimisation. This is the process

of adjusting the ARM code produced by the compiler to make it as efficient (and short) as possible. There are many types of optimisation, and if done properly the speed increase can be very significant. The ANSI C compiler optimises on a function by function basis, rather than statement by statement, and can produce very efficient code - in some cases as good as if it was written manually in ARMcode.

A very useful function of ISO C is the ability to set up *projects*. Basically, a project is a collection of the source files making up a complete program, together with a makefile (see later), and the compiled code. Facilities are provided to allow a project to be treated as a whole, and to compile an entire project in one go.

INSTALLATION

Both C compilers have to be installed in some way or another before they can be used. If you have a hard disc drive then the compiler can be copied onto that, and various directories set up to provide an 'environment' for developing C programs. The documentation for each compiler describes the details of this process. If you only have a floppy drive then it is still necessary to create a working disc as it is unwise to modify the original master. Both versions of C also have a new 'CLib' module which must be installed into the *!System* folder.

The layout of the two C systems on disc is different. ISO C is supplied on two discs. One of these contains the compiler application and this must be loaded before the compiler can be used. This registers itself as a large C on the icon bar. The second disc contains a pseudo-application directory called *!IsoCWork* which contains the standard header files and libraries. This disc must be present (or a copy of it) to allow the compiler to access header and library files during the compilation process.

The disc structure of ANSI C is rather more complex, spreading over three discs. The first disc is the work disc which contains the compiler, linker, the other utilities, compressed versions of the RISC_OSLIB header files and a number of examples. An interesting feature of ANSI C is that it doesn't need the ANSI header files to be on disc, as they are built into the compiler itself. The second disc contains the object code for the libraries along with the ANSI header, while the third disc contains more examples and un-compressed versions of the RISC_OSLIB headers.

COMPILING A PROGRAM

Armed with a working copy of your compiler, the moment of truth draws near - compiling your first program. As a starting point, we will use the example program given in last month's article. This is provided on this month's magazine disc for convenience. We will also assume that you are running the compiler from floppy disc.

The first stage, assuming that you do not have the magazine disc, is to enter the source code as a plain text file. With ANSI C, you should enter the source code using *Edit*, and save it in the directory $.User.C on your working disc. For argument's sake we will call the file 'Tables'. With ISO C, you should run the compiler application and click on the icon bar icon to open an editor window. The source code can then be entered and saved in the directory $.programs.c by choosing the 'Save all' menu option and entering the name.

The next stage is the compilation and linking. If you are using ANSI C then you will need to leave the Desktop and enter the following commands:

```
*MOUNT 0
*LIB $.LIBRARY
*DIRUSER
*CC Tables
```

The first three lines make sure that the current directory is set correctly, and that the compiler and linker can be found. It is the final line that actually invokes the compiler. This is the simplest form of the 'cc' command, and takes the file Tables from the subdirectory c, compiles it, and places the resulting object code in the directory o, keeping the same filename. The compiler then automatically invokes the linker, which links in the libraries as needed, and saves the executable code in the current directory.

To compile using ISO C, all you need do is choose the *Compile* option from the main menu, followed by the *Link* option to perform the linking stage.

Now, assuming everything went OK, you can actually execute the code. With ANSI C, enter the command:

```
Tables
```

to run the compiled program. You should see the output as shown in figure 1. To execute the program under ISO C, simply choose the *Run* option from the main menu.

MAKING IT WITH MAKE

If you think that the process of compiling a simple program is involved enough, consider what happens when you have a massive project spread across several C source files, along with a variety of header files, and some special patches written in ARM assembler for good measure. The situation can very quickly become too complex to handle. In particular, the problem of keeping files up to date is often a major headache. For example, if one of the source files is altered, it needs to be recompiled and then relinked, but it is not necessary to recompile the files that have not changed. On the other hand, if a common *include* file (see last month's article) was changed, then all the source files that included it would need recompiling.

Fortunately, both ANSI C and ISO C offer a solution to this by way of a Make utility. The operation of such a utility is too complex to explain in detail here, but basically it works by examining the date stamps of all the necessary files and using a list of dependencies held in a file called the *Makefile* to decide what action to take. For example, an object file is only up to date if all its source files are older than itself. If this is not the case, then the Make utility will issue the appropriate commands to recompile the object code from the sources.

The Make utilities provided with ANSI C and ISO C are different, though they both perform similar functions. In particular, the format of the Makefile that specifies the dependencies and actions differs between the two packages. In common with the other parts of the system, the ANSI C Make, called *Amu* (A Make Utility) is command line driven. With ISO C, the Make utility can only be used as part of a project. In this way, each project can have its own Makefile within it, and can be made up to date by selecting the appropriate project followed by the Make option.

COPING WITH ERRORS

Error handling with interpreted languages such as Basic is fairly straightforward. The program runs until an error occurs then stops. The error can either be a coding error, such as a wrong variable name or a misspelt keyword, or a run-time error such as trying to divide by zero.

Errors in C are a different kettle of fish. In particular, different errors manifest themselves at different points during the compilation cycle. Syntax errors such as incorrectly formed statements are picked up at the compilation stage, while errors such as misspelt variable names will be discovered by the linker.

C splits compilation errors into three classes. The least serious are *warnings*, and usually indicate a correct, but unusual, programing construct. The next level up are *errors* where the compiler can make an educated guess at the problem and fix it automatically. The final set of errors are those that are so serious that compilation must stop immediately. If the compiler is unable to continue, the linking stage is not performed. Similarly, if the linker fails, no executable code is produced. Run-time errors are reported as they happen, and as with Basic, it is possible to trap them with your own error handler routine.

ANSI C provides a symbolic debugger as part of the package. This allows a compiled program to be stepped through instruction by instruction, examining variables as you go, among other things. *ASD*, as the debugger is called, is a very powerful and useful tool.

Next month, Dec McSweeny takes over this series and starts looking at C programming in detail. RU

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Computer Concepts' LaserDirect Printer

Reviewed by Alan Wrigley

Traditionally there are two main ways of sending output to a laser printer (see Into the Arc elsewhere in this issue). You can compile and send a bit-map of the image, and the printer's own software will analyse the data and control the operation of the print engine to achieve the desired result on paper. Or you can prepare a PostScript program and send this to a PostScript printer, where again it is processed by the printer's own software. Either way, it is necessary for the printer to have a considerable amount of processing power, and also large amounts of RAM to hold images of any size. In the case of PostScript, the printer must also hold all the fonts to be used, either resident or downloaded.

All this makes laser printers expensive, and can introduce a time delay unless the printer's processor is extremely powerful. Computer Concepts' idea is delightfully simple - you already have one of the fastest micros on your desk, so why not use the power of the Arc to drive the printer?

The result is the LaserDirect. The package consists of a "dumb" print engine, and a software expansion card which fits into an Archimedes equipped with a backplane. At least 2Mbytes of RAM is recommended (though you might just get away with 1Mbyte if you print to file and then quit your application before sending to the printer). All the processing is done by this software, and the print engine is driven directly from am output port on the card. Optimum speed is achieved by operating under interrupts, and use of RAM is maximised by storing the print information in a compressed format. The LaserDirect therefore claims a high level of performance.

THE PACKAGE

The LaserDirect uses the same Casio engine and casing as in the Qume CrystalPrint page printer, and therefore looks identical. For full details of the ergonomics of the machine, and the cost of consumables, see the review of the CrystalPrint Publisher in RISC User Volume 3 Issue 4. The software supplied for review was not in its finalised form, but was sufficiently developed for all major functions to be performed. The software is contained in a ROM on the expansion card, and will have an auto-boot facility built in allowing you to install the printer driver automatically on start-up.

PERFORMANCE

The review sample was only available for a short while and so I could not carry out any exhaustive tests. However, I was able to make some direct comparisons between the performance of the LaserDirect and both the Panasonic KX-P4450 Laserjet compatible, and the Qume CrystalPrint Publisher Postscript printer (see RISC User reviews in Volume 3 Issues 3 & 4). Figure 1 shows comparative timings for the three machines.

	LaserDirect	Qume Publisher	Panasonic KX-P4450
Standard Draw File	39s	47s	3m 33s
Mode 12 screen	45s	71s	2m 43s
Impression A4 page	39s	69s	6m 35s

Figure 1. Comparative timings for the 3 printers

You will see that, for the sample files printed, the PostScript printer is considerably faster than the Panasonic, but the LaserDirect is even faster still. You must bear in mind, though, that the speed of a non-PostScript printer is dependent to some extent on the configuration of your computer. For example, all these tests were done with a font cache of 64K, and fonts installed on a hard disc. If you have to use a smaller font cache because of memory constraints, and you are accessing fonts from a floppy disc, then the time taken to print on the LaserDirect will increase, whereas the PostScript printer, with its built-in fonts, will not show any difference in speed. Nevertheless, when you consider that the

Laser Direct is priced at less than half the cost of the cheapest PostScript printer, it still represents remarkable value in terms of printing speed. And although I did not have an ARM3 available for testing, Computer Concepts claims that this will increase the speed by up to three times.

FUTURE DEVELOPMENTS

Computer Concepts is already planning to develop the LaserDirect concept further. An expansion card will be available to drive the Canon LPB4 print engine at a staggering 600 d.p.i. This engine is readily available, and the total cost of printer and software will be around £1500 (inc. VAT), bringing near typeset quality into the reach of the mass market for the first time. Also coming soon will be a PostScript compatible interpreter which will turn the Archimedes and LaserDirect into a very fast PostScript compatible printer, but using the Acorn outline fonts instead of resident fonts in the printer.

CONCLUSIONS

Although this was only a brief review, clearly this printer is an exciting development in the Archimedes world. With professional DTP packages now appearing, a fast, inexpensive printer such as the LaserDirect makes the Arc look an extremely attractive system for desktop publishing. There is a drawback, however. Because the printer has no intelligence of its own, it is dependent upon the Archimedes which drives it. If you decide to change to a different system, you cannot use the LaserDirect with it as you would be able to with other printers. However, it will be possible to upgrade the printer to any other in the Qume range, which would overcome this problem, but at a price. Nevertheless, if you are satisfied that your Archimedes will be around for a while, then I cannot see any better value for money on the market at present.

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Disabling Scroll Lock

by Lee Calcraft

The Scroll Lock key (next to the Break key) can be used to freeze the screen at any time during the display of text under VDU4 control. By the same token if a user presses the key without realising it, the application he is running will appear to hang. This does not occur within the Desktop environment because VDU5 graphics mode printing is used, but for other applications this can be something of an embarrassment.

The only way around the problem is to install some ARM code which periodically switches off the Scroll-Lock. This is what the accompanying program does. Once every second it switches off the Scroll Lock, and switches on the Number Lock.

To use the program, type it in carefully and run it. From that point on, until the machine is reset, the Scroll and Number Locks will be controlled as stated. To cancel the effect, you can type PROCscrollfixoff. Alternatively you can reset your machine by pressing the Reset key or powering up. The two procedures PROCscrollfix and PROCscrollfixoff are intended to be incorporated into other programs. If you do this, you should call PROCscrollfix once and once only at the start of the program, and PROCscrollfixoff once and once only at the end (whether the program ends via an error condition or not). You should not attempt to load other software while the fix is active, since the event handling code will be over-written by the new program.

HOW IT WORKS

The program works by setting up a periodic event. This is achieved using SYS "OS_CallEvery" (PRM page 572). The two parameters supplied with this call are the number of centiseconds between each call (100 in this case), and the address of the code to be executed each time the event is invoked.

The code to assert the Lock keys is simple, making use of OS_Byte 202 to set the two Lock states (see the PRM page 511) and OS_Byte 118 to make sure that the new state of these keys is reflected in their LEDs.

The code surrounding these two calls is used to stack the return address. This is essential since if a second event occurred during the processing, the return address would be lost. This is complicated by the fact that the return address of the SWI is stored by the ARM in R14_svc, so the first part of our code must change to svc mode in order to stack R14_svc. The reverse occurs on exit.

```
 10 REM             >SCrlOff4
 20 REM Program     Scroll Lock Off
 30 REM Version     A 0.4
 40 REM Author      Lee Calcraft
 50 REM RISC User July 1990
 60 REM Copyright Lee Calcraft
 70 :
 80 PROCscrollfix
 90 PRINT"Scroll fix installed"
100 END
110 :
120 DEFPROCscrollfix
130 DIM code% 100
140 FOR opt%=0 TO 2 STEP 2
150 P%=code%:[OPT opt%
160 .action
170 STMFD   R13!,{R0-R2,R8,R9,R14}
180 MOV     R9,PC    \save PC
190 ORR     R8,R9,#3\get svc ver of PC
200 TEQP    R8,#0    \enter svc mode
210 MOVNV   R0,R0    \null opcode to
220                  \avoid contention
230 STMFD   R13!,{R14}
240 \
250 MOV     R0,#202 \OS_Byte 202
260 MOV     R2,#249 \assert locks
270 MOV     R1,#0
280 SWI     "XOS_Byte"
290 MOV     R0,#118  \OS_Byte 118
300 SWI     "OS_Byte"\do leds
310 \
320 LDMFD   R13!,{R14}\restore R14_svc
330 TEQP    R9,#0    \re-enter orig mode
340 MOVNV   R0,R0     \null opcode
350 LDMFD   R13!,{R0-R2,R8,R9,PC}^
360 ]NEXT
370 SYS "OS_CallEvery",100,action
380 ENDPROC
390 :
400 DEFPROCscrollfixoff
410 SYS "OS_RemoveTickerEvent",action
420 ENDPROC
```

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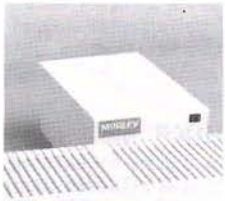

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Into the Arc

Making Sense of Printer Types

by Alan Wrigley

So far in the *Into the Arc* series we have concentrated on the Archimedes itself and on the software which is supplied with it. We will now turn our attention to the many hardware devices which can be connected to an Archimedes, and in this first article I will be looking at the various types of printer which are available.

A printer is normally the first item on the list when considering how to expand a basic Archimedes system. There are few serious uses for a computer which do not require some kind of printed result. However, choosing a printer is not as simple as it might appear. There is a bewildering array of models on the market, and to make matters worse there are a number of different types of printer, each of which copes better with some tasks than others, and each of which requires different software to drive it.

PRINTER DRIVERS

Before turning to a discussion of the printers themselves, it is necessary to introduce the concept of printer driver software. You cannot simply connect a printer to your Archimedes, press a button, and have everything you want printed out exactly as it appears on the screen. Printers basically understand three types of information: ASCII characters, bits of data which make up graphic images, and control codes which tell it how to interpret the information which follows. For example, some control codes might tell the printer to print everything that follows in italics, while others may tell it to treat the next n bytes as graphic data. Before printing anything from the computer, you need some kind of printer driver to send the right data to the printer at the right time.

Until the advent of RISC OS and multitasking, most applications contained a built-in printer driver. In other words, part of the software was designed to interpret the information to be fed to the printer and ensure that all the correct control codes were sent when necessary, followed by the data to be printed. However, the multitasking environment of RISC OS lends itself to the concept of stand-alone printer drivers which can be installed on the icon bar. This means that, as new printers come on the market with new facilities, it is only necessary to supply a new printer driver, instead of re-writing all existing applications.

WHICH TYPE OF PRINTER?

Printers fall basically into four types: dot matrix, daisywheel, ink jet and laser printers. Each of these uses a different technology, and each is better for some tasks than others. Acorn provides a range of RISC OS printer drivers which includes PrinterDM for dot matrix, PrinterIx for Integrex ink jet, PrinterLJ for HP Laserjet and compatibles, and PrinterPS for PostScript laser printers. The difference between these last two is explained later in the section on laser printers. There is currently no printer driver for daisywheel.

DOT MATRIX

This is the most common type, and has a column of tiny pins, usually either 9 or 24, in the print head. The printer's own software arranges for these to strike a ribbon, and hence imprint tiny dots onto the paper, in a sequence determined by the data to be printed. Thus the required image is built up from a matrix of dots, hence the name. Because the ribbons are easily interchangeable, it is often possible to substitute coloured ribbons for the normal black, and some dot matrix printers can handle multi-colour printing by using a ribbon containing strips of different colour which is moved up and down in front of the print head according to which colour is required.

In the early days of dot matrix, all printers were 9-pin, and few had a wide range of facilities; near-letter-quality print was unknown for example. As prices fell and technology improved, however, printers

became more sophisticated. Now it is possible to buy 24-pin, or even 48-pin, printers bristling with features such as a range of different fonts etc. As with all things, you get what you pay for, and the more expensive models can be expected to produce higher quality, have more features and print at a higher speed.

Dot matrix printers are very good general purpose machines, and are entirely adequate for simple tasks such as printing program listings. They are also very good for printing text files, and many will allow you to select from several different fonts via the front panel. Generally speaking, however, the higher the quality of printface, the lower will be the speed of printing. Also, multiple copies of a document each take the same time to print, whereas with a laser printer, once the file has been processed and printed, subsequent copies can usually be produced much more quickly. The noise from a dot matrix can sometimes be objectionable, particularly some 24-pins which produce a high-pitched whine.

When it comes to printing graphic images, or using a RISC OS printer driver on anything other than a pure text file, the speed drops by several orders of magnitude. Because each line has to be built up from individual dots, rather than characters which are already defined in the printer's own ROM, it can sometimes take several minutes to print out such an image. This is acceptable for occasional use, but can be an enormous disadvantage when printing, say, multi-page documents from a DTP package.

One phrase you will often hear in relation to dot matrix printers is "Epson-compatible". In the early days Epson was the most prominent manufacturer, and the control codes used by its printers came to be accepted as an unofficial standard. This means that in theory, any printer claimed to be Epson-compatible will work correctly with any software making the same claim. In practice, there are few things in computing which cause as many problems as interfacing computers and software to printers, despite claims of compatibility. This is another powerful argument in favour of the RISC OS printer drivers.

DAISYWHEEL

Daisywheel printers are no longer as common as they were a few years ago, mainly as a result of the improvement in print quality of dot matrix models and the advent of cheap laser printers. A daisywheel uses the same technology as the electric typewriter on which it is based, namely a plastic wheel on which the characters are formed, which is then rotated and pressed against the ribbon to imprint the character. This results in the highest possible quality from a printer, since the characters are not composed of dots, and also high quality carbon ribbons can be used. However, it is also slow and noisy, and to change fonts you have to manually change the wheel. If you require absolute letter quality and do not mind the slow speed, a secondhand daisywheel would be worth considering, but bear in mind that you cannot use it for graphic images or for reproducing any of the Arc's outline fonts, and also that you may have difficulty finding software which supports it.

INK JET

Ink jet printers are related to dot matrix, in that the image is formed from dots in exactly the same way, but the technology is very different. Instead of having pins in the printhead, tiny jets of ink are directed at the paper to build up the image. The quality from such printers can be very high, and the best of them can virtually produce laser quality at a significantly lower price (see the review of the HP DeskJet Plus in RISC User Volume 3 Issue 5). Another great virtue is the lack of noise.

Multi-colour ink jet printers are available, in particular the Integrex Colourjet, and these have proved to be very popular in schools. They are capable of producing quite stunning colour pictures with suitable software. They are, however, more expensive to run since special paper impregnated with chalk is needed to get the best out of the printer. This is because normal paper absorbs the ink to a certain degree, and the tiny dots of colour tend to spread slightly, degrading the image.

An ink jet is an excellent midway option between dot matrix and laser. For anyone who requires high quality colour printing, it

is probably the best option until colour laser printers are available at an affordable price. You should also consider one if you find the noise of a dot matrix objectionable. However, they can be more expensive to run than dot matrix printers.

LASER PRINTERS

A more accurate term would be "page printers", since some "laser" printers do not use laser technology, for example liquid crystal printers. Nevertheless, although the technology may differ, the technique remains the same, and was described in detail in *Introducing Laser Printers* (RISC User Volume 3 Issue 1). For the purposes of this article, we shall refer to all page printers as laser printers. What distinguishes these from the other three types is that everything sent to the printer is processed on a page by page basis, as opposed to line by line. In other words, an entire page must be defined before the printer will print anything at all. Laser printers are excellent for DTP work and printing graphic images, while having few disadvantages when it comes to more conventional printing requirements.

Laser printers fall broadly into two types: PostScript and non-PostScript. The term "PostScript" is in fact the name of a powerful computer language, known as a "page description language", built into the printer. When printing out a page of information, instead of merely sending the printer a bit-image map of the data to be printed (i.e. describing each pixel in the image one at a time), the PostScript printer driver in fact sends a program to the printer. This is compiled from information about the image, fonts used and their size, and so on. The program is interpreted by a processor in the printer and converted into a printable image.

With PostScript, fonts are held in the printer's memory, either built in or downloaded, and the PostScript program matches the font on screen to the font in the printer. This is fine if the fonts in the computer are designed to have a PostScript equivalent, as many indeed are, including Acorn's own. However, there are some fonts available which are not, and it may not be possible to print these on a PostScript printer. Given the correct resources, however, printing a PostScript file can be significantly faster than using the more traditional bit-image route, but it does add a significant price premium to the printer, and also requires all the fonts to be held in two places.

Non-PostScript laser printers, of which the HP Laserjet and its compatibles form the largest group, adopt the alternative approach, when printing a graphic image, of generating a complete bit map and sending this to the printer. This can be a lot slower for a single document, but does bring the price down. For printing in text mode, however, such printers normally have a range of built-in fonts which match or exceed the best dot matrix printers for quality.

While laser printers will always be faster than other types, when it comes to printing multiple copies the difference in speed is even more marked. Once a page has been sent to the printer, it is held in the printer's RAM and can be printed out any number of times very quickly - normally around 6-12 pages per minute. Laser printers are also very much quieter than dot matrix printers. Many models have an Epson emulation mode, too, which means that they can be used just like a dot matrix but with the advantage that the end result will generally be of a higher quality.

The main disadvantages of laser printers are the price, bulk, and lack of colour capability, and as prices continue to fall, the first of these will become less of an obstacle. In addition, running costs will generally be higher than those for dot matrix printers.

WHICH ONE?

Ultimately the choice of printer rests on the tasks you want to perform with it and the price you are prepared to pay. You should in any event see and hear any printer you may be considering, since the specification on paper will rarely give an indication of the print quality or the noise level. The choice is vast but I hope this article has given you some useful guidelines. You can also find some useful information on a wide range of printers, including some comparison tables, on pages 44-51 of the latest BEEBUG Retail Catalogue. RU

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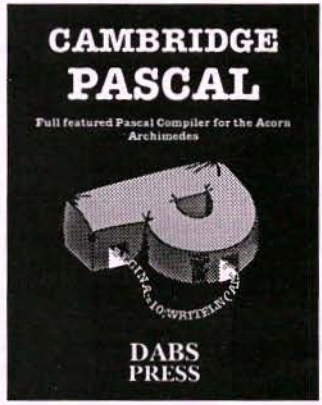

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Improving the Picture (Part 2)

David Spencer looks at some more monitors for the Archimedes.

RISC User Volume 3 Issue 6 contained a look at three Taxan monitors - the multisync 775 and 870, and the high resolution Viking 2. In this follow-up article we will look at some more monitors which have recently become available.

THE MICROVITEC CUB3000

The first monitor under inspection is neither a multisync nor a high resolution unit. It is instead a standard monitor comparable to the Acorn colour monitor and the Philips CM8833. I'm sure that many ex-model B users will feel at home as soon as they see the name Cub3000, as the original Microvitec Cub probably sold more to the Acorn market than all other monitors put together did.

The Microvitec Cub3000

As its name suggests, the Cub3000 is aimed at the A3000 market, particularly at education. It will however work perfectly well on an Archimedes. Like the original Cub, the Cub3000 is a very bland cube shape with a metal case finished in the same colour as the A3000 itself. A welcome change from the original Cub is that the plastic surrounding the tube is now the same colour as the case, whereas the earlier units had a dark brown surround. The tube is a conventional TV type - curved in both directions and featuring a glossy surface. A feature that is missing is any form of monitor stand, meaning that the screen is also perfectly vertical. I found this quite awkward for viewing when the Cub3000 was sat on top of an Archimedes.

Monitor	9060SZ	9070S
Screen size(inch)	14	16
Dot pitch (mm)	0.28	0.28
Bandwidth (MHz)	30	50
H Scan rate (kHz)	15.5-38.5	20-50
V Scan rate (Hz)	50-90	50-80
Width (mm)	360	400
Height (mm)	369	420
Depth (mm)	411	450
Weight (kg)	14.5	19

Table 1. Eizo specifications

In use, the picture quality is adequate, but no better than that offered by the Acorn monitor or the CM8833. All the controls, which consist of a power switch, brightness, contrast and volume, are on the rear panel. A built-in speaker can be used to reproduce the computer's sound, but only in mono. The mains lead is hardwired into the monitor, rather than having an IEC type connector, and more seriously, so is the RGB video lead. This means that the Cub3000 is really only suitable for the A3000 and Archimedes, and couldn't be transferred to other systems.

The Cub3000 costs more than either the Acorn monitor or the CM8833, and this, combined with its limitations, does not make it a very attractive buy. However, I am sure that some people will buy it because of its robustness and familiarity.

THE EIZO FLEXSCAN RANGE

The Flexscan range of monitors from a company called Eizo are all multisync units. The two of interest to Archimedes users are the 9060SZ and the 9070S. The 9060SZ is a low radiation 14 inch monitor, the specification of which is given in table 1. The 9070S is a 16 inch model, and its specification is also given in table 1. A special feature of both these monitors is a dynamic focusing system which adjusts the focus automatically

to give a crisp picture at all times. The monitors also have black and white and amber modes which can be selected to improve viewing of large amounts of text.

The display on both the 9060 and 9070 is slightly superior to that of the Taxan range, and the monitors also appear ergonomically better. In particular, all the picture size and position controls are easily accessible on the front panel, but in a manner which makes them unobtrusive.

The Eizo 9060S

An interesting problem with the 9070 (but not the 9060) is that its minimum horizontal scanning rate is 20kHz. This is higher than the 15.625kHz used by the non-multisync modes, and this means that the monitor cannot be used in modes 0-17 or 24. A way around this problem is by using a small hardware add-on to the computer called a VIDC Enhancer. This increases the clock frequency of the VIDC chip inside the Archimedes, which in turn increases the scanning rates. Not only does this solve the problem, but it also allows new higher resolution modes to be implemented and reduces the flicker on existing modes.

THE TAXAN 775 REVISITED

The Taxan 775, which replaces the 770, was previewed in the previous article. This monitor is now readily available in its standard form, with a low radiation model expected to be launched shortly.

In use, the 775 offers improved picture quality over the 770, because of its lower dot pitch. Unfortunately, the different scanning rate range offered by the 775 means that it is hard to set it up to obtain both a full-width multisync display and a normal resolution display that fits on the screen. If the monitor is adjusted to give a usable mode 12 display, switching to mode 20 gives a display that only fills about 70% of the screen's width. However, the 775 will work with the IBM standard VGA compatible modes 25-28. The older 770 could never be adjusted to fit the whole picture on the screen in these modes.

The Taxan 870 16 inch model which was examined last time has now been discontinued. Many people felt that this was the weakest product in the Taxan multisync range, mainly because the picture quality was poor compared to the 770 and 775. It is known that Taxan are working on a replacement 16 inch unit, but no details whatsoever are available yet.

THE TAXAN 795

Of more interest from Taxan is the forthcoming Multivision 795. This is a 14 inch monitor, like the 775, but differs in that it uses a Sony Trinitron tube. These tubes, which have been in existence for quite a while now, instead of having the usual three electron guns, one for each colour, have just a single gun and split the beam into three. This tends to give a much better, sharper picture, with higher quality colours. Another advantage is that trinitron tubes are cylindrical, so there is no vertical curvature, giving a less distorted image.

The disadvantage of the 795 is that it has a minimum scanning rate of 30kHz, even higher than the Eizo 9070S, and therefore can't be used in the non-multisync modes without a VIDC enhancer. However, this may be more than compensated for by its quality picture.

The 795 will be available from July, and costs around £804 (inc. VAT). The other monitors are available from Beebug, priced as below:

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Eizo 9070S (0187)	£759.95

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THE SERIAL PORT

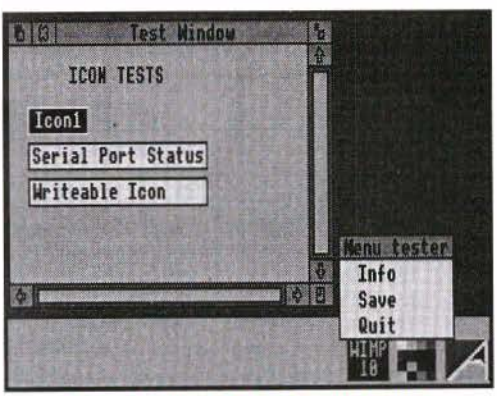
Mastering the Wimp
Part 10: Menus

by Lee Calcraft

THE WIMP MENU SYSTEM

Of the four major features of the Wimp system, as expressed in the acronym itself, we come now to the last. Having given some exposure to Windows, Icons and Pointers (the latter by implication), it is finally the turn of Menus.

Menus are handled by the Archimedes Wimp in a manner consistent with other aspects of the system, and if you have followed this series up to now, the following should have a familiar feel to it. Broadly speaking, menus are generated by calling Wimp_CreateMenu (SWI &400D4). This call requires a large parameter block to specify all the relevant data, including the text (or sprite) for each menu item, whether an entry is ticked, whether it has a right arrow indicating further options (or windows), the colours to be used and so on.



Implementing a three-option menu

Unlike this call's window-creating counterpart (i.e. Wimp_CreateWindow), Wimp_CreateMenu actually puts the menu on the screen, and handles all actions of the user. Thus if the user clicks outside the menu area, the menu will be removed, while if he selects an item, the Wimp will inform the task through the Wimp Poll using the new reason code 9. The task can then just check the parameter block returned by the Wimp to find out which selections the user has made.

INSTALLING A MENU IN THE EXAMPLE PROGRAM

The best way to see how the menu system works is to look at a real example. We will again take the tried and tested program from part 1 of the series. I will assume that you have modified it as the series has progressed, and that it is in a state similar to that achieved by the end of part 9, and that it has been renumbered using:

```
RENUMBER
```

This should make the last line number 1420. If not, do not worry too much, it will still be easy to implement the menu code. The only real necessity is that you should have included the icon code from parts 7-9 of the series, and in particular the icon with the handle i4handle% (plus the definition of FNicon from part 7). This is the icon which sits on the icon bar.

The first change to the test program is to remove the debugging code used in the Wimp Poll routine. This just involves altering the line which begins WHEN 8 (around line 560) to read as follows:

```
WHEN 8:SYS "Wimp_ProcessKey",block%!24
```

Next we must defer opening the task's main window until the user has clicked on the icon bar icon. To do this we need to move the code headed OPEN WINDOW (lines 310-360 on the renumbered version) to the end of the program, and place it within a procedure thus:

```
DEFPROCopenwindow
block%!0=whandle%
SYS "Wimp_GetWindowState",,block%
SYS "Wimp_OpenWindow",,block%
ENDPROC
```

Now we must alter what happens in response to Wimp_Poll reason code 6 - a

button press. Alter the line in the Wimp_Poll loop (at line 550 in the renumbered program) which begins *WHEN 6* to read:

```
WHEN 6:PROCbuttons
```

And append the following procedure definition to the end of the program:

```
DEFPROCbuttons
x%=!block%:y%=block%!4
CASE TRUE OF
  WHEN block%!12=-2
    IF block%!8 AND 2 THEN
      PROCdrawmenu(menu%,"Menu tester,
Info,Save,Quit",x%,y%,TRUE)
    ELSE IF block%!8 AND 5 THEN PROCop
enwindow
    ENDIF
  WHEN block%!16=ihandle%:SOUND 1,-15,
70,4
ENDCASE
ENDPROC
```

The purpose of this is to respond to three different button presses:

- Clicking Menu over the icon on the icon bar
- Clicking Select over the icon on the icon bar
- Clicking Select (or Adjust) over the icon in the test window.

These responses are decoded as follows. block%!12 (returned by the Wimp Poll with reason code 6) holds the handle of the window over which the button was clicked, or -2 if the user clicked over the icon bar. There is only one icon on the icon bar owned by our task, so if block%!12 is -2 then the user has clicked over it.

We now check block%!8 to see which button was pressed. If it was the Menu button we call PROCdrawmenu (see later), while if it was Select we open the task's window by calling the new procedure PROCopenwindow. Alternatively if block%!16 contains the handle of icon number one, a beep is sounded (for no better reason than to indicate how to respond to clicking over icons within a normal task window). Note of course, that until the task's window has been opened by clicking on the icon bar icon, this latter selection is physically impossible.

At this point, you should append the definition of PROCdrawmenu to the program (see listing 1), and alter line 90 as follows, to dimension a block of memory at menu% for use by the menu:

```
90 DIM block% &200,text1% &20,menu% &1
00
```

Note that you need a separate block of memory for this purpose because the data which it contains must remain intact for the whole time that the menu is open.

The sole purpose of PROCdrawmenu is to set up an appropriate parameter block and then call Wimp_CreateMenu. The definition of this block appears in table 1. The procedure falls into two sections. The first sets up the data for the first 28 bytes of the parameter block, controlling general aspects of the menu. The second uses a WHILE loop to set up the individual characteristics of each of the menu entries in turn.

In the first part of the procedure, we have set up the foreground and background colours of the menu, and a menu width of 140 graphics units. The height of each menu entry is set at 44 following Acorn's guidelines. The WHILE loop, which handles the individual menu entries is controlled by the string passed to the procedure (*Test task,Info,Save, Quit*). This contains the name of the title of the menu (usually the name of the application itself, and without the addition of the word "Menu") followed by the name of each menu entry, using comma separators. The maximum length of the name of any item is 12 characters, and Acorn's guidelines suggest that each entry should be in lower case except for an initial capital letter. Bytes 0-3 are set to zero, indicating that there should be no ticks etc. Bytes 4-7 are set to -1 indicating that there is no sub-menu, while the icon flags at bytes 8-11 are set to &7000021. This informs the Wimp that the icon which makes up each menu entry is a text icon with a filled background with foreground colour 7 and background 0.

R1 = -1 means close any active menu, or
R1 = pointer to menu block
R2 = x coord of top-left of top level menu
R3 = y coord of top-left of top level menu
R2 and R3 use operating system co-ordinates

R1+0	menu title (or null string)
R1+12	title foreground & frame colour
R1+13	title background colour
R1+14	menu work area foreground colour
R1+15	menu work area background colour
R1+16	width of menu
R1+20	height of each menu entry
R1+24	vertical gap between items
R1+28	menu items as follows (24 bytes each)

bytes 0-3

Bit	Meaning when set
0	display tick to left of item
1	dashed underline to separate item
2	item is writeable
3	generate message when moving to sub-menu
7	this is last item in menu

all others must be zero

bytes 4-7
sub-menu pointer (>=&8000) or
window handle (1-&7FFF) (-1 if none)
bytes 8-11
menu icon flags (as for normal icon)
bytes 12-23
menu icon data (as for normal icon)

Table 1. The parameter block supplied when calling SYS Wimp_CreateWindow

In our example each menu item is a piece of plain text in the system font, and this is supplied at bytes 12-23 for each menu item - though like ordinary icons, they could just as well be in an outline font, or be a sprite, or use indirection techniques to specify validation strings etc., or even be writeable.

The purpose of line 1810 in the program just after the end of the WHILE loop is to set bit 7 of the word at byte zero of the last menu entry to mark it as such. Finally Wimp_CreateMenu is called, which puts the menu on the screen. Note here the the parameters supplied in R2 and R3 (the top left co-ordinates of the menu). These are derived from the co-ordinates of the mouse pointer when the Menu button was pressed (passed to PROCdrawmenu as the parameters x% and y%). You will see that the y co-ordinate of the menu is made dependent on the parameter oniconbar%. This is because the Acorn guidelines suggest that icon bar menus should appear 96 OS units from the bottom of the screen.

Once SYS Wimp_CreateMenu has put the menu on the screen, the task can leave the handling of the menu entirely up to the Wimp until it returns a reason code of 9 in the Wimp Poll. This informs the task that a selection has been made from its menu.

The Wimp_Poll Menu_Selection Event

So far we have added to the test program all the code necessary for creating a 3 option menu. But our application will not yet respond to selections made by the user. To make this happen, we need to insert an additional line into the Wimp Poll CASE statement in the definition of PROCpoll (around line 570 in the renumbered version of the program). Insert the following line without overwriting any others:

```
WHEN 9:PROCmenuselect
```

Then add the following new procedure to the end of the program:

```
DEFPROCmenuselect
choice%=!block%
VDU 4
PRINT TAB(0,0)"Menu selection ";choice
%;SPC2
VDU 5
IF choice%=2 THEN quit%=TRUE
ENDPROC
```

This reads the number of the menu entry selected by the user, as returned by the Wimp.

The actual parameter block returned with reason code 9 is as follows:

R1+0	item in main menu which was selected (starting from 0)
R1+4	item in first sub-menu which was selected
R1+8	item in second sub-menu which was selected

etc.

ARM3 UPGRADE

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The Aleph One Limited ARM3 Upgrade propels the Acorn Archimedes range to give a phenomenal 10-12 MIPS (Million Instructions per Second). Acorn Computers' own VLSI Design Team has engineered this latest ARM processor to give performance on a par with top class workstations - based on the same ARM2 processor core already used in the Archimedes, ARM3 is machine-code compatible yet typically runs THREE times faster! Here's what some ARM3 users and reviewers have had to say...

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"... an Archimedes fitted with an ARM3 is still an inexpensive way to buy the 15 to 20 MIPS it offers on many programs."

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When running the C Dhrystone benchmark from the Desktop in mode 12 the ARM3 cache improves the performance from 4630 to 15480 dhrystones per second, a ratio of 3.4. Many BASIC or machine code programs will be sped up more than this - the improvement is highly dependent on the task being done and the screen mode. For detailed information on performance please write or 'phone us.

The fine print... Two speeds of ARM3 Upgrade are available, with clock rates of 20MHz and 30MHz. A 30MHz upgrade costs £595 + VAT (RRP). The 20MHz upgrade costs £495 +VAT (RRP). The 20MHz upgrade is only sold direct from Aleph One Ltd. - please call for availability. The Upgrade can be fitted to A310 & A440 models with the addition of a MEMC1a upgrade, and directly to A410, A420, A440/1 and R140 models. Available from all good dealers or directly from us.

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This list is terminated by an entry of -1, and since our menu currently has no sub-menus, we need look no further than R1+0 to determine the user's selection. The program stores this in choice%. The PRINT statement and the surrounding VDU 4 and 5 constitute a debugging device, and serve to display at the top left-hand corner of the Desktop the menu choice made by the user. The only choice which is responded to in this example is choice 2 *Quit*. This just sets quit%=TRUE, which results in termination of the task.

If you now run the test program by double-clicking on its icon in a directory viewer, it should install itself on the icon bar. Clicking with Select on this icon should open the task's window, while clicking Menu will bring up our test menu. If you make selections from this, you should see a number representing your choice displayed at the top left of the screen. Clicking on Quit will close down the task and remove the task's icon from the icon bar. At the moment, whether you make selections with the Select of Adjust buttons, the menu will disappear from the screen after the selection has been made. We will look into how to keep the menu active after Adjust selections (as required by Wimp guidelines) next month.

When running the test program, you may have noticed that clicking on the Close icon of the task's window closes the task down completely. This feature is a throwback from earlier versions of the test program which did not run from the icon bar. To make the Close icon close the application window without closing down the task, simply replace the line in the Wimp Poll (line 540 approx) which reads:

```
WHEN 3:quit%=TRUE
```

with:

```
WHEN 3:!block%=whandle%:SYS "Wimp_Clos
eWindow",,block%
```

This uses the new SYS call Wimp_CloseWindow to remove the window. It takes just one parameter: R1, and this should contain a block of memory containing just one word at block%: viz. the handle of the window to be closed.

It may be worth experimenting with the program at this stage. Try altering the menu's menu flags so that some of the entries are ticked, or have dashed lines beneath them (the purpose of these is to divide a menu into sections). You may also like to alter the number of items in the menu, and to implement a CASE statement in PROCmenuselect which performs different actions depending on which selections have been made from the menu.

Next month we will look at the implementation of extensions of this simple menu to include ***Info*** *boxes,* ***Save*** *boxes and sub-menus.*

Listing 1

```
1630 DEFPROCdrawmenu(m%,menu$,x%,y%,oni
conbar%)
1640 menu%?12=7:menu%?13=2
1650 menu%?14=7:menu%?15=0
1660 menu%!16=140:menu%!20=44
1670 menu%!24=0:ptr%=menu%+28
1680 $menu%=LEFT$(menu$,INSTR(menu$,","
)-1)
1690 menu$+=","
1700 entries%=0
1710 WHILE menu$<>""
1720   menu$=MID$(menu$,INSTR(menu$,","
)+1)
1730   IF menu$<>"" THEN
1740     !ptr%=0:ptr%!4=-1
1750     ptr%!8=&7000021
1760     $(ptr%+12)=LEFT$(menu$,INSTR(m
enu$,",")-1)
1770     ptr%+=24
1780     entries%+=1
1790   ENDIF
1800 ENDWHILE
1810 ptr%!-24=ptr%!-24 OR &80:REM mark
item as last
1820 IF oniconbar% THEN ypos%=96+entrie
s%*44 ELSE ypos%=y%+20
1830 SYS "Wimp_CreateMenu",,menu%,x%-64
,ypos%
1840 ENDPROC
```

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S·C·A·N·LIGHT

SCAN-LIGHT 3000

Scan-Light 3000 is the only scanner designed specifically for the Archimedes A3000. The package consists of an internally fitting expansion board, power supply, software on board and a 400 dpi hand-held scanner.

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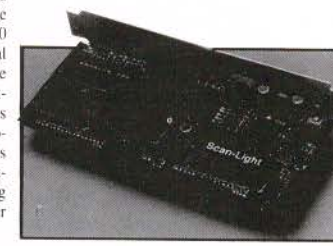

The Archimedes is a computer that can handle both graphics and text with equal ease, and Scan-Light is the best way to obtain pictures for the computer - ideal for capturing photographs, artwork or graphics of any sort.

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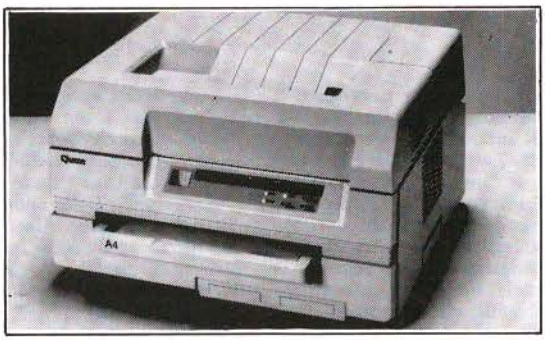
LASER DIRECT



THE ARCHIMEDES LASER PRINTER

The LaserDirect consists of an interface board, our RISC OS printer driver software, and a special version of the 300 dpi Qume six page per minute printer. Because the board drives the printer 'engine' directly, not only does this save a complex controller board usually resident in the printer, but it also means it prints very much faster than traditional printers. The speed is a combined result of our optimised RISC OS printer driver, the RISC processor and the unique 2Mbit/second data link to the printer. One other significant advantage is that the LaserDirect uses the Acorn outline fonts installed in the machine, so guaranteeing all fonts seen on screen will print - no need to make sure the fonts match those installed in your PostScript printer.

The result is a printer whose quality is the same or better than traditional lasers, that can use all RISC OS outline fonts, that is faster than traditional printers, and costs less.

The Qume Liquid Crystal Printer is not technically a laser printer. Instead of having a laser and spinning mirror arrangement, this printer has a conventional light source shining through a liquid crystal shutter array. The result is fewer moving parts, a lower cost and a more reliable printer. It also occupies a very small amount of desk space - 42cm by 42cm, no more than a standard dot-matrix.

Special features - Software on board means it is always available and can be automatically installed on startup - no loading from disc • The LaserDirect offers special links to other Computer Concepts software. For example, when combined with the new Scan-Light Plus software, it offers a direct scan to print facility. It can scan and print a full A4 page in under a minute. • A PostScript compatible interpreter will also be available, turning the Archimedes and LaserDirect printer into a very fast PostScript compatble printer (but using the Acorn outline fonts).

LaserDirect Qume (incl. printer, interface board, and software) £999 +VAT & carriage

Compatible with all applications that use RISC OS printer drivers, e.g. Draw, Paint, Pipedream, ADP, Impression etc.

PERFORMANCE TESTS

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Typical PostScript	12'03s	5'13s	4'16s	£3000
Typical LaserJet	5'35s	4'29s	31'35s	£1400
LaserDirect Qume	2'43s	1'00s	4'29s	£999

The LaserDirect requires a minimum of 2Mbytes of RAM in the Archimedes. However, the more memory available the better the performance. The tests were performed on an A420 machine (2Mbytes RAM) with hard disc. All times in minutes and seconds.

Test 1 - A complex page of text and graphics from Acorn Desktop Publisher
Test 2 - The same test page from Impression
Test 3 - A 10 page text document from Impression

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Hints & Tips. . . Hints & Tips

VDU4 NEWLINE

Alan Wrigley

When typing or editing text or programs in VDU4 mode, on reaching the end of the line the cursor does not immediately move to the start of the next line, but stays over the last character typed. A "pending newline" is flagged, but not activated until the next character is entered. This can be a little confusing within an editor if you are used to the more normal situation where a new line is generated immediately. However, you can turn the effect off with the following command:

```
VDU 23,16,0,254,0;0;0;
```

and turn it back on again with:

```
VDU 23,16,1,254,0;0;0;
```

SPRITES AND FORMED

David Spencer

When using Acorn's window template editor, *FormEd*, it can normally only display the standard set of sprites held in the RISC OS ROM. For example, if you are designing a save box to save draw files, the draw file icon would not appear within *FormEd*, as the sprite (file_aff) is not in the ROM. Luckily, though, *FormEd* allows new sprites to be merged in by dragging a sprite file onto the *FormEd* icon on the icon bar. So. for example, dragging the *!Sprites* file from *Draw* onto *FormEd* will make the Draw file sprite visible.

MORE SPRITES AND FORMED

David Spencer

The current version of *FormEd* doesn't allow indirected *sprite-only* icons to be defined. Typically, these are used to allow an icon's sprite to be in a different sprite area from that defined in the parent window. What's more, if you try to read a template containing such a definition into *FormEd* then the application crashes rather messily. The solution to this is to patch the icon definition after it has been read from the template file by SWI "Wimp_LoadTemplate", but before calling SWI "Wimp_CreateWindow".

YET MORE ABOUT FORMED

David Spencer

A minor, but important, point to note about templates created using *FormEd* is that the window will be created in the same position on the screen as it was in the editor. For example, if you create a window in the bottom left-hand corner and behind all other windows, then loading the template, defining and opening that window will cause it to be opened in exactly the same place. The solution is to again patch the template definition before opening the window, or to ignore the existing position when using SWI "Wimp_OpenWindow".

PAGE, HIMEM AND END

Alan Wrigley

The Basic variables PAGE, HIMEM and END can give some useful information about the program environment. PAGE under RISC OS is, by default, &8F00. However, you should not assume that this is always the case. Future versions of the operating system may use a different value. Also, it is theoretically possible for an application to alter the value of PAGE, though unlike the BBC micro environment, there is little reason to do so.

HIMEM gives the upper limit of the application workspace, in this case the space allocated to Basic when the language is entered. The maximum amount of memory normally allocated to Basic is 640K, which results in HIMEM being &A8000. However, this may be lower if other applications have already claimed workspace, or indeed you can make it higher if sufficient memory is available by using the Task Manager to increase the *Next* slot before entering Basic.

END is a very useful variable which performs a function not easily achieved on the old BBC micro (but it must not be confused with the statement END which terminates the execution of a program). END returns the address of the end of Basic variables in memory, i.e. the lowest spare location. What makes END even more useful is that you can also use it to set the highest address used by Basic. So you can increase or shrink the application workspace, e.g. END=&A000 or END=&B0000. This can be used within a program to dynamically allocate more memory for the task.

FONT PROBLEMS

Chris Parker

David Pilling's hint in RISC User Volume 3 Issue 4 stated that Edit would crash with more than 12 fonts installed. A simple but inelegant solution to this is to insert the following line into Edit's !Run file:

```
Unset Font$Prefix
```

then double-click on !Fonts after loading Edit but before running any other applications that require outline fonts.

It appears, too, that Draw is designed to run with a maximum of 64 fonts. As a result, I restrict my !Fonts application to about 60, and swap fonts over as required.

Data Store's FontFX also has difficulty coping with large numbers of fonts. The variables *fontlist%* and *fontmenu%* (to be found within PROCInitialise_Variables in the application's !RunImage file) should be dimensioned to at least &1000.

Hints & Tips. . . Hints & Tips

However, Impression copes perfectly with the 127 Fonts that I now have.

FINDING PATHNAMES

David Spencer

When writing a Desktop application that can load and save files, you often need to find just the leafname (filename) given a full pathname. For example, the leafname of:

```
adfs::Winnie.$.Applics.DataFiles.Letter
```

is 'Letter'.

The following short function does just that - taking a full pathname and returning just the leafname. It works by 'peeling off' elements of the pathname until only the leafname remains.

```
1000 DEF FNleaf(path$)
1010 WHILE INSTR(path$,".")
1020 path$=MID$(path$,INSTR(path$,".")+1)
1030 ENDWHILE
1040 =path$
```

As it stands, the routine is only guaranteed to work with full pathnames. It cannot handle pathnames such as:

```
adfs::blob
```

where no '.' is present in the line. This isn't a major problem, though, as only full pathnames should appear in a Desktop application.

BASIC EDITOR

Mike Ironmonger

Typing EDIT from within Basic to enter the Basic editor actually executes the command *ARMBE. When the editor module is present it recognises this and starts up the editor. If it is not present, however, the filing system tries to execute the file *ARMBE*. You can take advantage of this by creating an Obey file called *ARMBE* in the library directory which will load and enter the editor, as follows:

```
RMLoad <filepath>.BasicEdit
FX21
Key0 EDIT|M
FX138,0,128
```

The first line loads the module, and <filepath> must contain the pathname depending on where the module is located. The second line clears the keyboard buffer and the remaining instructions insert the command EDIT into the buffer. RU

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Postbag

PRESENTER II FROM LINGENUITY

I would like to comment on Mike Williams' review of Presenter II in RISC User Volume 3 Issue 4. He remarks that there is no way of directly creating an empty data entry sheet; there is - you simply click with Select on the Presenter II icon and a new data entry sheet appears on the screen.

Peter Barlow

I can recall trying all sorts of things to achieve this at the time of the review, but I clearly overlooked the most obvious. I could not find this information in the manual either.

ARCHIMEDES THEFT

I would like to inform you that my A310 system was stolen today. The details are as follows:

A310 (serial number 27-AKB15-1000816) with Watford I/O controller, BEEBUG 40Mbyte drive (Ser. No. 20052), Computer Concepts ROM/RAM podule, Watford 5.25" disc buffer, Cannon 5.25" drive, Acorn colour monitor (28-AKF11-1001998) and Star LC-10 printer (313080772520 I think).

Yours depressed,

Martin Platts, Birmingham.

We will pass on to Mr.Platts any information which we receive. It may also be opportune to remind readers of the desirability of checking that their computer system is adequately covered by household insurance, and that reasonable attention is given to security aspects.

APPLICATION SHELL GENERATOR

There appears to be a slight problem with the ***Application Shell Generator*** *(see RISC User Volume 3 Issue 5). The generated sprites are defined as 35 by 18 units rather than the more normal 34 by 17 units. To adopt the standard size, change the program as follows:*

```
840 RECTANGLE FILL 190,320,67,67
860 RECTANGLE 190,320,67,67
1200 MOVE 190,320:MOVE BY 67,67
```

and add:

```
205 GCOL bor:RECTANGLE 190,320,67,67
```

David Carr

Mr.Carr is right in what he says, in that by convention most RISC OS sprites are 34 by 17 units in size. However, RISC OS can and does use sprites which are larger than this, and the program will function quite happily with the slightly larger size.

RECOVERING LOST FILES WITH TOOLBOX

I would like your advice on the use of the RISC OS Toolbox. What are the steps needed to recover lost files?

B.S.Hudson

To recover any file from disc you need a disc sector editor such as that contained in Toolbox to locate the file on disc. Use this to determine the disc address of the first sector containing the file, and the size of the file (in bytes), by browsing through the disc sectors and examining each in turn. Now, from Basic, read the sectors of the file into memory using SYS "ADFS_DiscOp". The syntax is:

```
SYS "ADFS_DiscOp",,1,<disc address>,
    <address>,<file size>
```

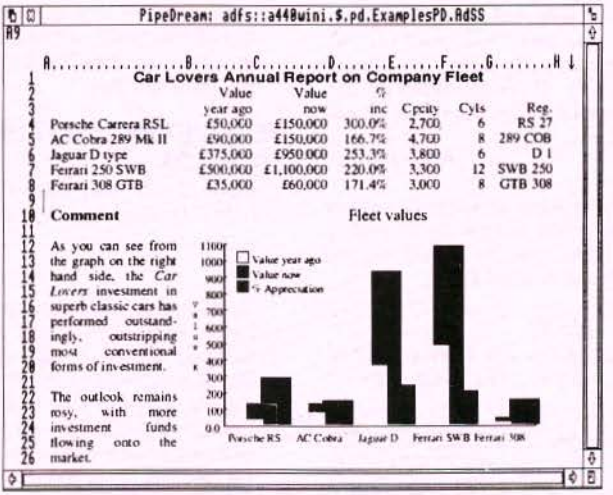
where <disc address> is the address of the first sector as determined above, <address> is the start address in memory where the sectors are to be stored (we suggest &9000), and <file size> is the size of the file in bytes rounded up to the nearest multiple of 1024. Then save the file back to disc using *SAVE <file name> (see the User Guide for more details of this command).

Note that with 'E' format discs, a file may be spread over different areas of the disc. It will then be necessary to locate all of these segments and read them into contiguous areas of memory using multiple calls to SYS "ADFS_DiscOp".

FOOTNOTE

Further to Mr.Masefield's letter in the April issue (Volume 3 Issue 5), the effect of restricted pointer movement referred to (in mode 16) appears to be more a function of RISC OS than it is of the application. In these circumstances, dragging any available window to the right of the screen appears then to free the pointer so that its movement is then unrestricted. *RU*

PIPEDREAM 3


PipeDream: adfs::a440wini.$.pd.ExamplesPD.AdSS
Car Lovers Annual Report on Company Fleet
Value year ago
Value now
% inc
Cpcity
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Reg.
Porsche Carrera RSL £50,000 £150,000 300.0% 2,700 6 RS 27
AC Cobra 289 Mk II £90,000 £150,000 166.7% 4,700 8 289 COB
Jaguar D type £375,000 £950 000 253.3% 3,800 6 D 1
Ferrari 250 SWB £500,000 £1,100,000 220.0% 3,300 12 SWB 250
Ferrari 308 GTB £35,000 £60,000 171.4% 3,000 8 GTB 308
Comment
As you can see from the graph on the right hand side, the Car Lovers investment in superb classic cars has performed outstandingly, outstripping most conventional forms of investment.
The outlook remains rosy, with more investment funds flowing onto the market.
Fleet values
Value year ago
Value now
% Appreciation
Porsche RS
AC Cobra
Jaguar D
Ferrari SWB
Ferrari 308

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All trademarks acknowledged. The chart in the screen shown above was produced by sending numbers from PipeDream 3 to Lingenuity's Presenter 2 and then loading the resulting graph back into PipeDream 3.

Colton Software, Broadway House, 149-151 St. Neots Road, Hardwick, Cambridge, CB3 7QJ, England.

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Technical Queries

USING *FX3 FOR OUTPUT

Dear Sir,

*In RISC User Volume 3 Issue 2 there is a note on printing with VDU2 and *FX3. *FX3,10 which avoids any need for VDU2 by sending all further output only to the printer, is so useful that I was surprised to find it omitted, and from both editions of the User Guide. The second edition implies that there are better RISC OS replacements for most *FX commands. I would like to know how they replace *FX3.*

*There is a snag with using *FX3,10 which I have been unable to explain. Can you help? If I use VDU2 and key in all those tedious 1's everything works correctly. If I use *FX3,10 there can be snags.*

D.M.McDowell

*FX3,10 *is* very useful, but it suffers from one drawback, which is causing your problem. When using VDU2 to output to the printer, any single character immediately following a '1' is sent regardless. However, when using *FX3,10 to print, the currently configured printer ignore character is taken into account, and that character is not sent to the printer. This is often set to 10 to ignore line feeds, but this means that every occurrence of code 10 is ignored.

If your Archimedes is configured to *Noignore* status, or if you type *Noignore at the command line before running a program, then everything will get through to the printer correctly, though you would need to reset the printer's dip switch to avoid line feeds. Even with this setting, if a previous program has used *FX6 this will override any configured setting until the next hard Break.

Unless you know exactly what your program outputs there is no easy way to satisfy all requirements. If character 10 is set to be ignored, you could trap, say, any margin settings or downloaded characters by using a statement such as:

```
IF A%=10 VDU FNten ELSE VDU A%
```

and include in the program a function FNten such as:

```
DEF FNten
*FX3,0
VDU2,1,10,3
*FX3,10
=0
```

With regard to the replacement of *FX3 by a RISC OS command, I imagine that Acorn's intention is that all output should use the RISC OS printer drivers, and that the older style of commands would become obsolete. To my knowledge, there is no direct replacement for *FX3 as such.

Alan Wrigley

FINDING BASIC PROGRAMS

Dear Sir,

I am puzzled about the RISC User discs. I understood that I would be able to list any of the programs (e.g. Wimp4) from the disc so that I might be able to edit them and see what difference the alterations make - as suggested. However, I have been unable to list a program, although I have been able to run them. Can you please help?

E.Twigg

There is no problem with listing any program on a RISC User magazine disc, but you do have to find it first. When you open the directory viewer for a RISC User disc, you will see the !RU... application directory. The '!' character signifies that this is an application directory, not an ordinary one, and therefore runs the application in response to double-clicking.

In order to open an application directory, you must double-click on its icon while holding down the Shift key. Doing this with !RU... will reveal a number of files and a further directory called *Programs*. Open this directory with a simple double-click, and you will find all the programs for that issue of RISC User, most of them in the form of applications.

Taking this one stage further, Shift-double-click on any of these applications to reveal the files that it contains. One of these (usually called !RunImage) is the program itself, and this can be modified within Basic. The easiest way to do this is to install the BEdit utility from RISC User Volume 3 Issue 4. Alternatively, exit from the Desktop by pressing F12, type Basic at the star prompt. Then use the *DIR command to locate and open the Programs directory, and load the program in as normal.

Alan Wrigley RU

RISC USER MEMBERSHIP

RISC User is available only on subscription at the rates shown below. Full subscribers to RISC User may also take out a reduced rate subscription to BEEBUG (the magazine for the BBC micro and Master series).

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Elsewhere	£34.00	£51.00

All subscriptions, including overseas, should be in pounds sterling. We will also accept payment by Connect, Access and Visa, and official UK orders are welcome.

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The programs from each issue of RISC User, together with a number of additional items, are included on a monthly 3.5" disc. This will be available to order, or you may take out a subscription to ensure that the disc arrives at the same time as the magazine.

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Single issue discs	£4.75	£4.75
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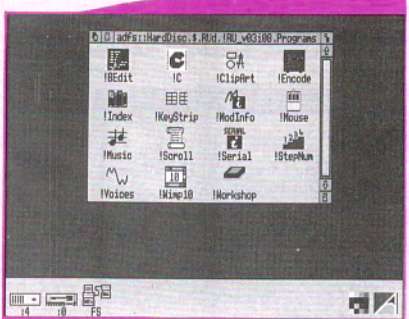
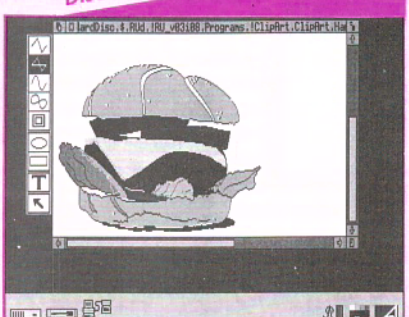


Disc Contents



DTP Resources

!Modinfo Updated

PROGRAMS LISTED IN RISC USER JULY/AUGUST 1990

A Handy Mouse Speed Controller
A handy utility which allows you to select different mouse pointer speeds by clicking on the icon bar icon.

Wimp Applications Made Easy
This program demonstrates how a ready-made Wimp application shell can be used for the quick and simple creation of single-window applications.

Assembler Workshop: Writing Applications
Two programs to illustrate ARM code applications in stand-alone and module form.

Stepped Renumber
An Archimedes version of BEEBUG's utility for renumbering Basic programs, which can be used with the RISC User Basic editor from Volume 3 Issue 4.

Disabling Scroll Lock
A short program which allows you to disable the Scroll Lock key when running applications.

ADDITIONAL PROGRAMS DESCRIBED IN THE MAGAZINE

Introducing C
The sample source code from last month's article together with its compiled form.

Mastering the Wimp (Part 10: Menus)
The test program from this series, updated in the previous articles, which demonstrates Wimp menu systems.

BONUS ITEMS

DTP Resources
Two draw files to illustrate Clipart from Midnight Graphics.

!Modinfo Updated
An extension to the ROM module utility to include RAM modules.

Basic Editor Front-End
An updated version of the Bedit application to include dual column printing and the step renumbering utility from this issue.

24 Pin Keystrip generator
The keystrip generator from RISC User disc Volume 3 Issue 3 adapted and enhanced to work on 24 pin printers.

File Encryption Utility
A utility which allows you to code files for protection and decode them for further use.

ArcScan Data
The ArcScan data files for this issue of RISC User and BEEBUG Vol.9 No.2.

Note: The simplest way of accessing any RISC User magazine disc (since Volume 3 Issue 1) is to double-click on the 'RU' icon in the directory viewer for the disc.

BEEBUG SCAVENGER

The Beebug Scavenger image scanner adds life to **Desktop Publishing, Word Processing, Drawing and Painting,** and many other activities. Just some of the possible uses are:

- Incorporating photographs and drawings into text documents.
- Scanning pictures to use them as templates for line drawings.
- Creating artwork for exciting title screens.
- Scanning photos and text to make a graphical database.

Scavenger consists of a professional quality ***scanner,*** a half-width ***interface card,*** and a comprehensive ***user guide*** covering installation, use, hints and tips, technical information and routine maintenance.

Scavenger is available with two different scanners. For most users the **half-width scanner,** capable of reading an image up to 105mm wide, will be suitable. If you find your requirements grow, you can upgrade to the **full A4 width** device, Scavenger A4, which can scan a 216mm wide image.

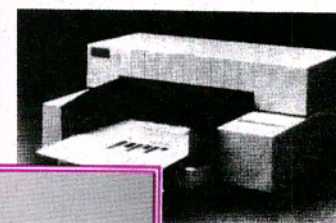
	Price	Stock Code
Scavenger	£194.95	0730G
Scavenger 3000	£219.95	0735G
Scavenger A4	£439.95	0731G
Scavenger 3000 A4	£469.95	0733G
Sheetfeeder for A4 models	£179.95	0732G

All prices include VAT. Carriage on these items is £7.
The Archimedes models of Scavenger are available now, the AS3000 models will be available in July.

To obtain the greatest scanning precision, a **sheet feeder** can be added to Scavenger A4. This is fully automatic and can scan an entire A4 page under software control in just 15 seconds.

The Hewlett-Packard DeskJet Plus printer uses ink jet technology to obtain an output quality approaching that of the laser printer. Yet it costs only a fraction of the price, weighs a mere 14 lb (the Panasonic KX-P4450 laser printer weighs 56 lb), and requires a minimum of maintenance.

Immediately on top of the collecting tray for This latter uses a mecl each emerging sheet until and then drops it onto (face up in reverse order The reason for the presumably to prevent i being smu arrival of t have to experienced during tests graphics noticeably da some signs wrinkling of t



The Desk both serial interfaces, a Archimedes though

The **Wimp-based software** to operate the Beebug Scavenger is incorporated in a ROM on the interface podule. Scavenger is operated from the Desktop, and you can choose whether you want the software to install itself automatically on the icon bar, or whether you wish to start it manually through a star command. Just some of the features offered by the software are:

- Variable image size, with the maximum width being limited by the scanner, and the depth limited only by the available memory.
- Real-time display into a window as the image is scanned.
- Save the scanned image as a sprite or as a bit-image Draw file.
- Conversion of dithered monochrome image to sixteen grey levels. Ideal for enhancing photographs.
- Full control of optional sheet feeder to allow automatic scanning.

Technical Specification

Maximum image width:	105mm for Handheld models; 216mm for A4 models.
Maximum image depth:	Limited only by available memory
Resolution:	100, 200, 300 and 400 dots per inch for handheld model; 200 dots per inch for A4 model
Scanning mode:	Reflective with CCD sensor
Dropout Colour:	Yellow-Green (570nm)
Operational modes:	Black and white or 16 grey levels for A4 model; Black and white or choice of three patterns of 32 grey levels (focusing, dot and mean) for the Handheld model
Interface:	Half-width expansion card, fitted internally to Archimedes, or in external case (supplied) to A3000
Power Source:	Internal for Archimedes; from external unit (supplied) for A3000
Computer requirements:	Either an A3000 or an Archimedes with RISC OS, a podule backplane and at least 1 Mbyte of RAM
Software:	ROM-based Desktop application